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MONTEREY, CALIFORNIA

THESIS

CHINA'S RARE EARTH POLICIES: ECONOMIC STATECRAFT OR INTERDEPENDENCE?

by

Robert K. Smith

December 2012

Thesis Advisor: Naazneen H. Barma
Second Reader: Robert J. Weiner

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REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.

1. AGENCY USE ONLY *(Leave blank)*	**2. REPORT DATE** December 2012	**3. REPORT TYPE AND DATES COVERED** Master's Thesis

4. TITLE AND SUBTITLE
CHINA'S RARE EARTH POLICIES: ECONOMIC STATECRAFT OR INTERDEPENDENCE?

5. FUNDING NUMBERS

6. AUTHOR(S) Robert K. Smith

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Naval Postgraduate School
Monterey, CA 93943-5000

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES)
N/A

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government. IRB Protocol number ____N/A____.

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited

12b. DISTRIBUTION CODE
A

13. ABSTRACT (maximum 200 words)

This study is about discovering to what extent China uses its rare earth element policies as a tool of economic statecraft. With China's virtual monopoly on this resource and the United States' increasingly growing demand, it is necessary to examine how China intends on using its economic power. The study builds a comparative framework using both structural realism and neoliberal institutionalism, by identifying theory predictions in terms of China's strategic intent and the specific policies it might employ in the rare earth element sector. Specifically, the study finds that Beijing has and will continue to use its rare earth policies as a tool of economic statecraft, but with restraint. Despite its present reliance on economic interdependence with the United States, as China continues to modernize the structure of its economy, more statecraft interventions will likely occur. Beijing was successful in utilizing its rare earth policies as a tool of economic statecraft both by influencing the behavior of its international and its domestic commercial actors. China will leverage its near-monopoly on the rare earths industry by continuing to aggressively employ policies that meet its long-term strategic objectives.

14. SUBJECT TERMS China, United States, Economic Statecraft, Rare Earth Elements, Structural Realism, Neo-liberal Institutionalism, Interdependence.

15. NUMBER OF PAGES
115

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	**18. SECURITY CLASSIFICATION OF THIS PAGE**	**19. SECURITY CLASSIFICATION OF ABSTRACT**	**20. LIMITATION OF ABSTRACT**
Unclassified	Unclassified	Unclassified	UU

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18

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CHINA'S RARE EARTH POLICIES: ECONOMIC STATECRAFT OR INTERDEPENDENCE?

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Submitted in partial fulfillment of the
requirements for the degree of

**MASTER OF ARTS IN SECURITY STUDIES
(FAR EAST, SOUTHEAST ASIA, AND THE PACIFIC)**

from the

**NAVAL POSTGRADUATE SCHOOL
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ABSTRACT

This study is about discovering to what extent China uses its rare earth element policies as a tool of economic statecraft. With China's virtual monopoly on this resource and the United States' increasingly growing demand, it is necessary to examine how China intends on using its economic power. The study builds a comparative framework using both structural realism and neoliberal institutionalism, by identifying theory predictions in terms of China's strategic intent and the specific policies it might employ in the rare earth element sector. Specifically, the study finds that Beijing has and will continue to use its rare earth policies as a tool of economic statecraft, but with restraint. Despite its present reliance on economic interdependence with the United States, as China continues to modernize the structure of its economy, more statecraft interventions will likely occur. Beijing was successful in utilizing its rare earth policies as a tool of economic statecraft both by influencing the behavior of its international and its domestic commercial actors. China will leverage its near-monopoly on the rare earths industry by continuing to aggressively employ policies that meet its long-term strategic objectives.

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LIST OF ACRONYMS AND ABBREVIATIONS

AFL-CIO CLC USW	United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial and Service Workers International Union
CCP	Chinese Communist Party
COD	Chemical Oxygen Demand
CRS	Congressional Research Service
DoD	Department of Defense
EU	European Union
GAO	Government Accountability Office
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GE	General Electric
HREE	heavy rare earth
IMCOA	Industrial Minerals Company of Australia
LREE	light rare earth
MLR	Ministry of Land and Resources
MOC	Ministry of Commerce
NdFeB	Neodymium Iron Boron
NDRC	National Development and Reform Commission
PRC	People's Republic of China
REE	rare earth element
SmCo	Samarium Cobalt
SOE	state-owned enterprise

USGS	United States Geological Survey
USITC	United States International Trade Commission
USMMA	United States Magnetic Materials Association
USTR	United States Trade Representative
WTO	World Trade Organization

ACKNOWLEDGMENTS

I would like to personally thank my thesis advisors, Professor Naazneen Barma and Professor Robert Weiner, for their thorough guidance, timely feedback, and high standards. Without their enduring support and assistance during my time here at the Naval Postgraduate School (NPS), many of the valuable contributions to this study would not have been possible. I have benefitted immeasurably from their constructive instruction on both this study and in my broader scholarly training while at NPS.

I am also grateful to the remarkably talented and dedicated faculty at NPS, who had the misfortune of reading my essays for the past eighteen months, including Dr. Naazneen Barma, Mr. Randy Burkett, Dr. Michael Glosny, Captain Jennith Hoyt, Dr. Wade Huntley, Dr. Letitia Lawson, Dr. Casey Lucius, Dr. Alice Miller, Dr. Zachary Shore, Commander Tim Unrein, and Dr. Robert Weiner.

I am deeply indebted to the U.S. Naval Intelligence Community, especially Vice Admiral Kendall L. Card, for giving me the opportunity to attend the Naval Postgraduate School.

Most importantly, none of this would have been possible without the lifelong love from my family. My dad once said: All I ask of you is that you do your absolute best and give life one hundred percent. He has always been the wisest man I have known, and I am honored to have him as my hero. My mom has showed me the true meaning of love, compassion and prayer, and for that I am forever grateful. I cannot thank my wife, Eunkyong, and my three beautiful daughters, Faith, Grace, and Hope, enough for their tireless support and encouragement throughout this process. From the beginning to the end, they have been unfailing in their love and devotion.

Finally, I give thanks and praise to my almighty Savior, Jesus. Your unconditional love and support throughout this endeavor was a true blessing.
To Him, this thesis and I are dedicated.

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I. THESIS OVERVIEW

A. INTRODUCTION:

This thesis will evaluate how China has managed its rare earth element (REE) policies since its accession to the World Trade Organization (WTO) in 2001, a period in which China rapidly accelerated its integration with the global economy and sustained unprecedented growth. Specifically, this study will attempt to answer the question as to what extent China is using its REE policies as a tool of economic statecraft. In an effort to identify China's true policy orientation on rare earths, an assessment framework will be constructed through the lens of two principal international relations schools of thought: structural realism and neoliberal institutionalism. By highlighting the basic theory predictions of these theories as to how we would expect China to behave relevant to its rare earth policies, I aim to assess whether China is indeed implementing policies in the mineral sector as a tool of economic statecraft. The analysis will continue with three illustrative stories detailing China's policies affiliated with rare earths. Finally, the study will conclude by addressing the strategic implications for the United States and attempt to provide some perspective on the important question of what type of rising power China will be.

B. IMPORTANCE:

How China will use its economic power after more than three decades of unprecedented growth remains among the most critical subjects in contemporary international relations. As mentioned above, this study focuses specifically on China's REE policies and attempts to assess whether or not those policies are being utilized as a tool for economic statecraft. As evident towards the beginning of the 21st century, China's policies associated with the rare earths market (e.g., resource quotas, export tariffs) have brought tremendous attention and concern throughout the international system. In particular, recent Chinese rare earth

policies have instigated much apprehension for China's largest economic rival, the United States.

Why have rare earths taken on such importance? China controls approximately 97% of the world's REE market. These rare earths, which are not widely known because they are so low on the production chain, are essential to hundreds of high tech devices, many of which define our modern way of life. Without REEs, much of the world's modern technology would be incredibly different and a large degree of applications would not be feasible. We would not have the capability to utilize smaller-sized technology, such as laptop computers and cellular phones, without the use of rare earth elements.[1] In today's modern era, there are also important defense applications such as jet fighter engines, missile guidance systems, anti-missile defense, space-based satellites and communication systems.[2] Moreover, REEs are fundamental to the development of green technology such as the latest generation of wind-powered turbines, plug-in hybrid vehicles, and oil refineries, where they serve as catalysts.[3]

World demand for rare earths was estimated at 136,100 metric tons in 2010, with global production around 133,600 metric tons annually. The gap is covered by above ground stocks or inventories. According to the Industrial Minerals Company of Australia, (IMCOA) global demand for REEs will be 185,000 metric tons in 2015. China's production levels may reach 140,000 metric tons per year in 2015 as China's annual demand is assessed to rise to 111,000 metric tons. The Chinese Rare Earth Industry Association, however, estimates China's demand to increase to 130,000 metric tons by 2015. That said, the non-

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[1] Cindy Hurst, *Institute for the Analysis of Global Security (IAGS)* (March 2010).

[2] U.S. Library of Congress, Congressional Research Service*, Rare Earth Elements: The Global Supply Chain,* by Marc Humphries, CRS Report R41347 (Washington, DC: Office of Congressional Information and Publishing, September 6, 2011).

[3] Hurst, *Institute for the Analysis of Global Security (IAGS)* (March 2010).

China annual production would need to be between 45,00 metric tons to 70,000 metric tons in order to meet the global demand for REEs.[4]

With China producing 97% of the world's REEs and continuing to impose quota restrictions and export tariffs, the United States arguably has a legitimate reason for concern.[5] According to the United States Geological Survey (USGS), the United States obtains its REE raw materials from foreign sources, almost exclusively from China. Similarly, import dependence upon a single country raises serious issues of supply security.[6] As for assessing the United States' vulnerability to mineral-supply disruptions, any shortage of the rare earth element barite would be significant as this rare earth is critical to the U.S. oil and gas industry.[7] But even beyond the oil and gas industries, which account for the largest percentage of United States REE demand, many scientific organizations have concluded that certain rare earth elements are critical to United States national security and are becoming increasingly more important in defense applications.[8] Take for instance the REE dysprosium and terbium. Both of these REEs are essential in fabricating permanent magnets that are crucial components in many military weapon systems. Unfortunately a lack of production capability remains a vulnerability for the United States as these two REEs are currently only available from China.[9] Although United States domestic reserves and inferred resources of REEs are approximately 1.5 million metric tons, its hard to estimate how much of that reserve and resource will be economically

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[4] U.S. Library of Congress, "Rare Earth Elements: The Global Supply Chain," 3–4.

[5] Ibid., 13.

[6] Keith R. Long, "The Principal Rare Earth Elements Deposits of the United States – A Summary of Domestic Deposits and a Global Perspective," *United States Geological Survey*, November 16, 2010, http://pubs.usgs.gov/sir/2010/5220/.

[7] Ibid., 18.

[8] U.S. Library of Congress, "Rare Earth Elements: The Global Supply Chain," 8.

[9] U.S. Library of Congress, Congressional Research Service, *Rare Earth Elements in National Defense: Background, Oversight Issues, and Options for Congress*, by Valerie B. Grasso, CRS Report R41744. (Washington, DC: Office of Congressional Information and Publishing, March 31, 2011).

available, when and at what rate. The United States currently has a preponderance of light rare earths while lacking sufficient domestic heavy rare earths. As the pipeline of new rare earth projects within the United States is rather low, with 10 out of 150 REE exploration projects identified worldwide, the United States must increasingly look to foreign sources such as China for its critical supply.[10]

As for China, its continued economic growth and increased consumer demand has prompted more of its domestic REEs to remain in country. China wants an expanded and fully integrated REE industry where exports of value added materials are preferred. China's goal is to build-out and serve its domestic manufacturing industry and lure foreign investors to partake by positioning foreign-owned facilities in China in exchange for access to rare earths as well as access to the developing Chinese market. Additionally, safety and environmental factors will likely raise the cost of operations in China's rare earth industry as domestic consumption is becoming a priority for China.[11]

By specifying not only the importance behind this natural resource but also the degree to which China is using this sector as a tool of economic statecraft, this study will expand general knowledge of China's economic conduct. In the context of Chinese contemporary strategic studies, this study also offers insight into the economic dimension of China's international relations.[12] Identifying China's goals and strategic intent in this inductive manner will enable us to draw conclusions as to what the United States should do, strategically, if anything at all, and it gets to the question of what type of rising power China will be.

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[10] Keith R. Long, "The Principal Rare Earth Elements Deposits of the United States."

[11] U.S. Library of Congress, "Rare Earth Elements: The Global Supply Chain," 17.

[12] William J. Norris, "Economic Statecraft with Chinese Characteristics: The Use of Commercial Actors in China's Grand Strategy" (Ph.D. diss., Massachusetts Institute of Technology, September 2010).

C. PROBLEMS AND HYPOTHESES:

This thesis will apply the lenses of the two prominent international relations theories (structural realism and neoliberal institutionalism) in an attempt to frame China's policies and the extent of economic statecraft in the rare earth element sector. Despite there being a considerable volume of literature in both the international political economy and international relations fields on these two schools of thought, actual examples of how these two theories impact the metals industry, specifically rare earth policies are rare. Consequently, this study will utilize these theories to evaluate the strategic consequences of China's behavior in REEs.

Are China's REE policies being implemented such that other actors including the United States are compelled to behave in a specified manner or do China's actions foster co-operative relations? Structural realism suggests that China would act in the pursuit of relative gains and implement policies of economic statecraft in a sector in which they enjoy such leverage; neoliberal institutionalism predicts a more interdependent picture of China's policies as it pursues absolute gains. Both theories are feasible; however, only one theory truly explains the actions China has initiated recently surrounding its REE policies with the United States. As such, this study will further examine these two main theories and attempt to characterize China's recent rare earth element policy actions.

D. METHODS AND SOURCES:

In this study, I develop a comparative framework to access China's REE behavior on the basis of structural realism and neoliberal institutionalism, by laying out what each theory would expect us to predict in terms of China's strategic intent and the specific policies it might employ in the REE sector. I apply this assessment framework to different aspects of China's REE behavior and conclude, on balance, that China is indeed employing an economic statecraft approach to the sector. This empirical assessment of Chinese economic

behavior is supplemented by three illustrative stories of specific incidents/policies in the sector. The goal of this thesis is to answer the question of whether China is employing its REE policies as a tool of economic statecraft. The overall process described above does so by building an analytical narrative of China's REE policies through qualitative comparative analysis.

Beginning with a comprehensive literature review, this study will test the above hypothesis by highlighting evidence from the international media, trade press, academia, think tanks and Chinese and U.S. government reports.[13] Specifically, U.S. government reports will provide factual material for all three illustrative stories, although some critical reports will offer substantive content. For instance, the Congressional Research Service (CRS) authors, Wayne M. Morrison and Rachel Tang, have written abundantly about REEs and consequently are identified as authoritative sources throughout this study.

E. THESIS OUTLINE:

This study is organized into five distinct chapters. Chapter I offers a general overview of the thesis including the overall importance of the study, hypotheses used, as well as sources and methods prescribed.

Chapter II covers Chinese REEs and provides a detailed description of China's rare earth sector. The intent of this chapter is designed primarily to give the reader a basic overview of rare earths and highlight their growing importance to the international community.

Chapter III's main focus is to provide basic international relations theory predictions that characterize China's behavior associated with rare earths as well

[13] Examples of international media, trade press, think tanks, academic, Chinese, and United States government sources for the Sino-United States case are: Keith Bradsher, "China is Blocking Minerals, Executives Say," *The New York Times*, September 24, 2010; R. Colin Johnson, "Rare Earths Get Rarer, "*Electronic Engineering Times*," August 15, 2011; Cindy A. Hurst, "China's Rare Earth Industry: What Can the West Learn?" Washington, D.C., *Institute for the Analysis of Global Security* (IAGS), March 2010; Robert Looney, "Recent Developments of a New Technocratic Mercantilism Emerging in China?" *World Economics* 12:1 (2011): 71; Marc U.S. Library of Congress, "Rare Earth Elements: The Global Supply Chain," *Congressional Research Service* (CRS), September 6, 2011.

as offer likely U.S. policy responses. By accurately defining both theories (structural realism and neoliberal institutionalism) and using each as a basic framework to predict China's rare earth policy actions, we can better measure the extent to which China is using its policies as a tool of economic statecraft. Also embedded within this chapter are key definitions, concepts, and terms that assist the reader in understanding the nuances behind economic statecraft and interdependence. The chapter concludes by addressing both the interactions between the Chinese government and its industry while also supplementing the economic statecraft perspective by articulating what the efficient tools of statecraft would be in the sector.

Chapter IV opens by laying out a comparative assessment of China's REE policies on the basis of two international relations theory predictions. The second half of the chapter supplements the comparative assessment by highlighting three illustrious stories containing specific policies relevant to the rare earth industry. The first illustrative story and arguably the most important involves China's halt on rare earth shipments to Japan in response to a 2010 maritime incident that occurred in contested waters of the East China Sea. This story is clearly an example of China's ability to leverage its soft power capabilities, particularly economic activities, in order to achieve Chinese strategic interests. The second example chosen also encompasses both China and Japan; however, in this example China is taking advantage of its economic power and utilizing its rare earth policies to compel Japan to move its production facilities to China in order to attain new technological developments. Nevertheless, in either case, these examples clearly illustrate China's utilization of significant economic power coupled with an ability to direct its economic might toward an international actor to attain a strategic objective. The third and final story also exhibits economic statecraft; however, in this specific example China's rare earth policy affects Chinese domestic corporations. With Chinese state-owned enterprises (SOEs) exercising rare earth policies that focus on consolidation, the state is able to garner substantial economic power and attain long-term strategic goals.

Chapter V concludes the study by offering an overall conclusion, details the various strategic implications for the United States and offers some insight as to what type of rising power China will be.

This thesis has four key findings. First, although Beijing has and will continue to utilize its rare earth policies as a tool of economic statecraft, it will do so rather cautiously. To be sure, China's capabilities in economic power are continually expanding along with its effectiveness in choosing from a vast array of economic statecraft policy options; however, its present reliance on economic interdependence with the United States often checks its leverage in exercising economic power. Nevertheless, as China continues to modernize the structure of its economy by transforming the country to a dominant center of innovation, more coercive measures will likely occur.

Second, Beijing has been successful in utilizing its rare earth policies as a tool of economic statecraft not only by influencing the behavior of international actors but also through deliberate interaction with its domestic commercial actors. As evident in two of the three aforementioned illustrative stories, China was effective in leveraging its rare earth policies as a tool of economic statecraft against Japan and arguably the U.S. Similarly, story three reveals Beijing's ability to manipulate the economic activities of its domestic industrial partners. Specifically, the Chinese government has leveraged its economic power by imposing rare earth policies against both private rare earth firms and SOEs.

Third, although Beijing clearly desires deeper integration with the global economy through the continual use of rare earth policies, this will not be at the expense of losing any control within the Chinese Communist Party (CCP).[14] This finding is predicated primarily on the fact that China is moving toward a rare earth industry that is consolidated under principally state-owned enterprises (SOEs).

Finally, despite the many conditions for determining China's effectiveness in economic statecraft, the ability of the Chinese government to structure its REE

[14] Norris, "Economic Statecraft with Chinese Characteristics," 35.

sector and direct its domestic enterprises (i.e., both SOEs and private corporations) is especially significant. Unlike many other developing countries, China is unique in that its domestic economies are organized via a series of government-business relations. And more often than not, it is the nature of China's domestic relationships that dictate the magnitude by which Beijing has control over its economic interaction with the United States.[15] Thus, in the end, when China maintains more control over its domestic economy, it will be fare more likely to attain success in its efforts to engage in economic statecraft internationally.

15 Ibid., 67.

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II. RARE EARTH ELEMENTS OVERVIEW AND BACKGROUND

A. INTRODUCTION

China produces 97% of the world's rare earth elements (REEs), an essential component in a vast array of advanced civilian and military capabilities. Increasing global demand coupled with recent Chinese aggressive policy measures have led to international concerns surrounding future supply shortages. Despite current United States initiatives to develop alternative sources for rare earths, the Government Accountability Office (GAO) has stated that it could take over a decade before the United States is capable of rebuilding its U.S. sourced rare earth supply chain. Furthermore, China's monopoly over rare earths has prompted apprehension of China using its policies as leverage to influence the United States' foreign policies.[16]

This chapter is designed to give the reader a basic overview of what REEs are and their growing importance to the United States. The material represented will also explore a brief history of rare earths paying particular attention to China and its trade with the United States.

B. WHAT ARE RARE EARTH ELEMENTS?

According to the U.S. Geological Survey (USGS), there are 17 rare earth elements (REEs), 15 within the chemical group called lanthanides, plus yttrium and scandium.[17] Despite the name, rare earths are not "rare." Rather, they are moderately abundant in the earth's crust. In the same instance, however, they are dispersed and are typically found mixed together in other deposits, which make it challenging to find rare earths in a concentration significant enough to mine and process economically. When rare earths are extracted from the earth, the ore containing the rare earths must go through a series of complex

[16] U.S.-China Economic and Security Review Commission, *China's Rare Earths Industry and its Role in the Internaitonal Market* (November 2010).

[17] U.S. Library of Congress, "Rare Earth Elements: The Global Supply Chain," 1.

separation processes to produce each individual element. Although there are other costs connected to rare earths, it is the separation process that largely dictates the cost of rare earth production.[18]

Although rare earths can be found in a variety of minerals, the most prevalent REEs are found primarily in bastnaesite and monazite. Bastnaesite generally contains the light rare earths and a small amount of the heavy earths, while monazite also contains mostly light earths, but the percentage of heavy earths is two to three times larger. According to USGS, bastnaesite deposits in China and the United States comprise the most significant quantity of rare earth resources. Monazite deposits consist of the second largest segment while these are found in Australia, Brazil, China, India, Malaysia, South Africa, Sri Lanka, Thailand, and the United States. Other instances of minerals that are known to contain rare earths include secondary monazite, ion absorption clays, spent uranium solutions, xenotime, apatite, cheralite, eudialyte, loparite, and phoshporites.[19]

REEs are separated into two categories, light rare earths and heavy rare earths. The light rare earths, which are more prevalent, consist of lanthanum through europium (atomic numbers 57-63) while the heavy rare earths, less predominant than light earths and generally used in high-tech applications, contain gadolinium through lutetium (atomic numbers 64-71). Yttruim is generally classified as a heavy rare earth.[20]

C. MAJOR END USES AND APPLICATIONS

Rare earths are used in a variety of applications and can be found in a multitude of industries. Within the oil industry, rare earths are used in petroleum

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[18] U.S. Library of Congress, Congressional Research Service, *China's Rare Earth Industry and Export Regime: Economic and Trade Implications for the United States,* by Wayne M. Morrison and Rachel Tang, CRS Report R42510 (Washington, DC: Office of Congressional Information and Publishing, April 30, 2012).

[19] Hurst, *Institute for the Analysis of Global Security (IAGS) (*March 2010).

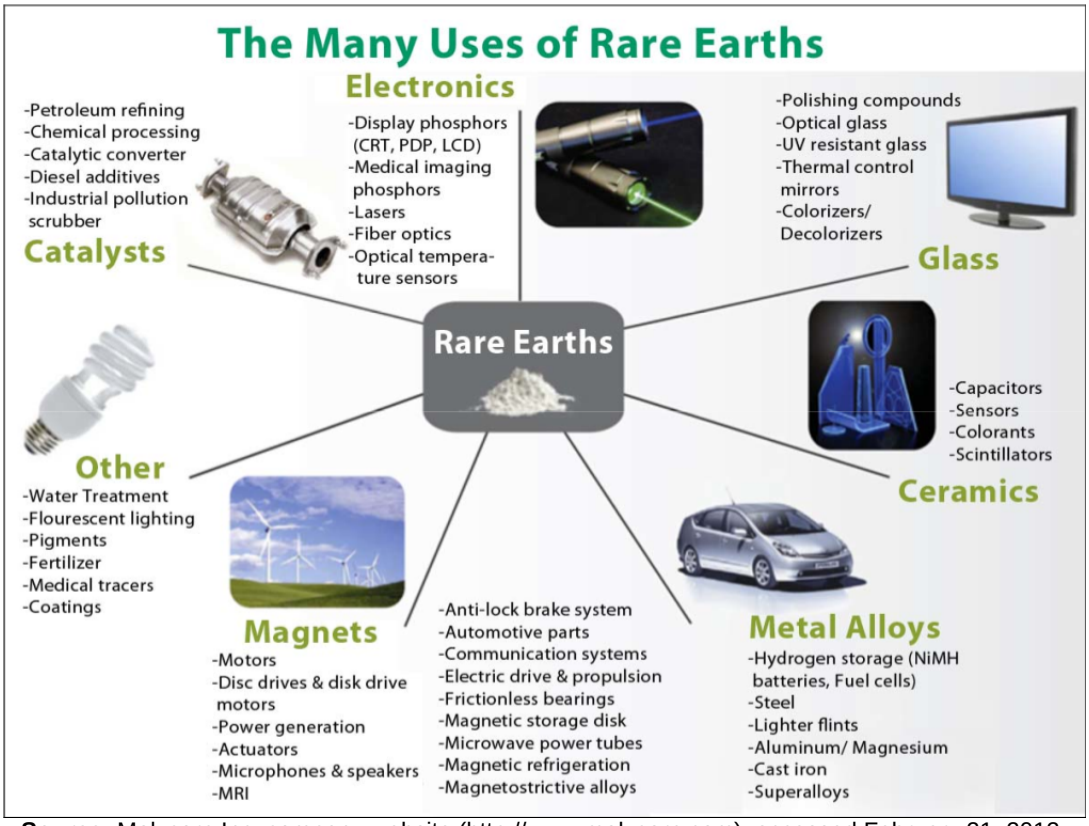
[20] U.S. Library of Congress, "Rare Earth Elements: The Global Supply Chain," 2.

refining and as diesel additives; rare earths are crucial to the automotive industry due to their wide application in motors, generators, catalytic converters and hybrid vehicle batteries; they are utilized in the electronics industry to produce mobile phones cameras and computer disk drives; and these elements are used in powerful magnets in wind-power turbines. (**See Figure 1.**)

While rare earth applications in high-tech devices have existed for decades, it is their application in the defense industry and clean energy technologies that has attracted the world's immense demand for rare earths.[21] DOD estimates that the United States uses about 5% of the world's supply of rare earths for defense purposes. Rare earths are used in two types of commercially available permanent magnet materials: samarium cobalt (SmCo) and neodymium iron boron (NdFeB). NdFeB magnets, known to be the world's strongest permanent magnets, monopolize rare earth magnet usage in the defense industry and are a vital component to several military weapon systems. Similarly, SmCo is essential for military technologies as this rare earth has the capability to retain its magnetic strength at high temperatures. These rare earths are often used in the following defense applications: precision-guided missiles, smart bombs, aircraft engines and many others.[22]

[21] Wayne and Tang, "China's Rare Earth Industry and Export Regime," 3.

[22] Grasso, "Rare Earth Elements in National Defense," 3.



Source: Molycorp Inc. company website (http://www.molycorp.com), accessed February 21, 2012.

Figure 1. Applications of Rare Earths

D. PRODUCTION PROCESS AND WORLDWIDE PRODUCTION LEVELS

According to Government Accountability Office (GAO) figures, China accounts for the following in world production of rare earths:

- 97% of rare earth ore
- 97% of rare earth oxides
- 89% of rare earth alloys
- 75% of NdFeB magnets
- 60% of SmCo magnets

The rare earth production process consists of the following five stages: mining, separating, refining, alloying, and manufacturing rare earths into value-added, end-use products.

The first stage is comprised of excavating the ore from the ground

The second stage involves separating the ore into individual rare earth oxides.

The third stage entails refining the rare earth oxides into metals; oxides can be dried, stored, and shipped for further processing into metals.

The fourth stage involves forming metals into alloys.

The fifth and final stage is manufacturing the alloys into individual products, such as permanent magnets.[23]

As for world production levels, China holds a near-monopoly on rare earths, with 97% (130,000 metric tons). However, rare earth reserves and the reserve base are more scattered throughout the world. As indicated by the USGS, China holds 50% of the world's rare earth reserves while the United States holds approximately 13%. South Africa and Canada (included in the "other" category) have substantial reserve potential with Russia, India, Australia, Brazil, and Malaysia all having trace amounts available.[24] (**See Table 1 and Figure 2.)**

[23] Ibid., 7.

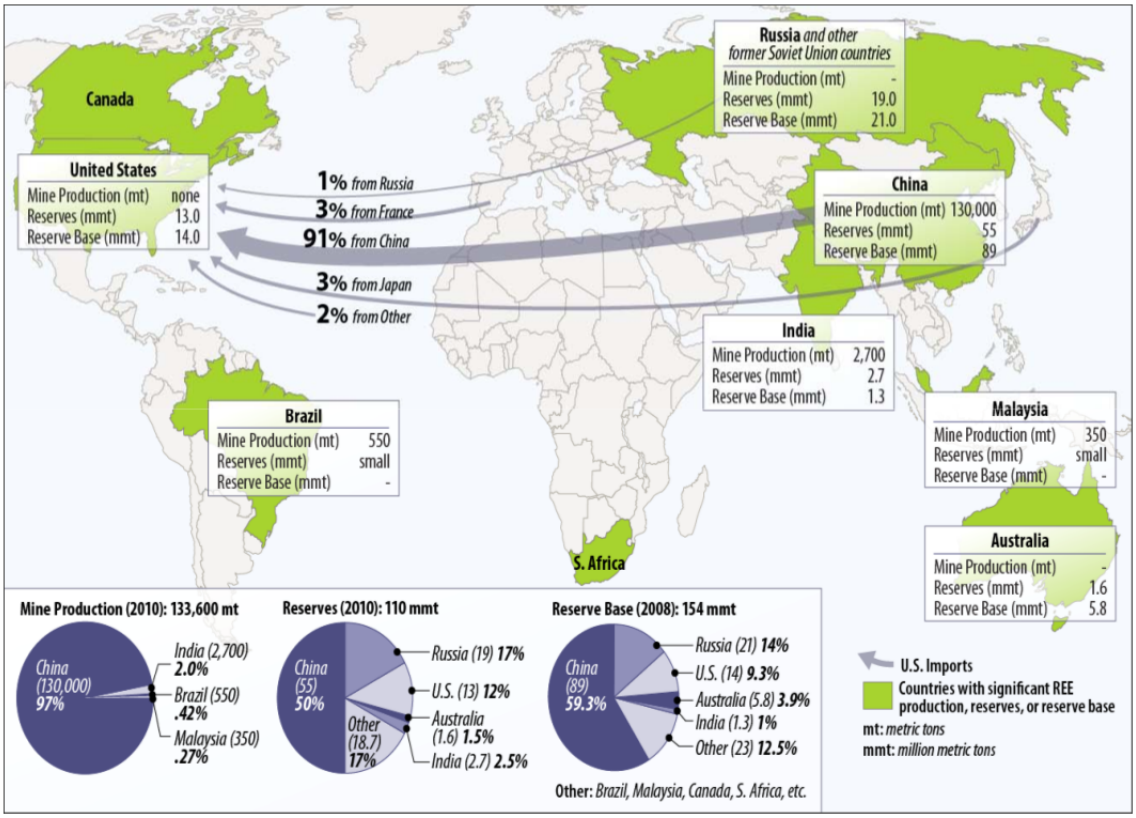
[24] U.S. Library of Congress, "Rare Earth Elements: The Global Supply Chain," 9.

Table 1. Rare Earth Elements: World Production and Reserves - 2010

Country	Mine Production (metric tons)	% of total	Reserves (million metric tons)	% of total	Reserve Base[a] (million metric tons)	% of total
United States	none		13.0	13	14.0	9.3
China	130,000	97.3	55.0	50	89.0	59.3
Russia			19.0	17	21.0	14
(and other former Soviet Union countries)						
Australia			1.6	1.5	5.8	3.9
India	2,700	2	3.1	2.8	1.3	1
Brazil	550	0.42	Small			
Malaysia	350	0.27	Small			
Other	NA		22.0	20	23	12.5
Total	133,600		110.0		154	

Source: U.S. Department of the Interior, Mineral Commodity Summaries, USGS, 2010.

a. Reserve Base is defined by the USGS to include reserves (both economic and marginally economic) plus some subeconomic resources (i.e., those that may have potential for becoming economic reserves).



Source: U.S. Geological Survey, Mineral Commodity Summaries, 2008-2011. (Figure created by CRS.)

Figure 2. Rare Earth Elements: World Production, Reserves and U.S. Imports

E. CHINA'S RARE EARTH RESOURCES

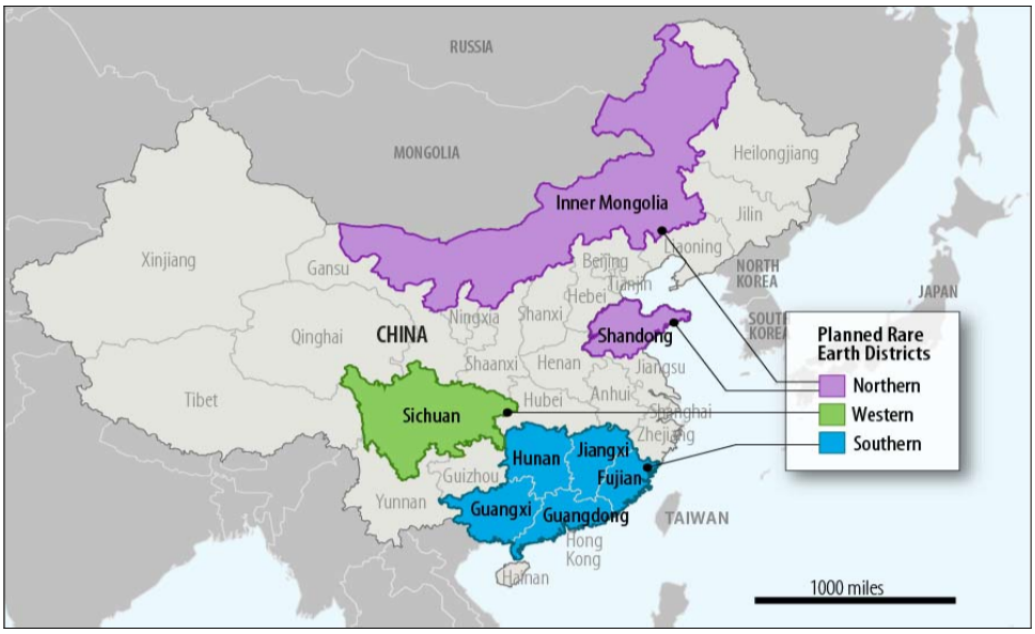
Throughout the world, there are three known and confirmed locations where abundant concentrations of rare earth resources exist: Baiyun Obo of Inner Mongolia, China; Mountain Pass, California, where Molycorp's mine is located and has returned to production; and Mt. Weld, Australia, which is known to be rich in deposits but still requires the necessary infrastructure to begin mining, separation and transport to a viable market.[25]

[25] Morrison and Tang, "China's Rare Earth Industry and Export Regime," 8.

China is rich in rare earth resources and, as noted by the USGS, has half of the world's total rare earth reserves. Known in China as "industrial vitamins,"[26] a plethora of rare earth deposits were discovered in over 20 provinces and autonomous regions within China. China's largest rare earth reserve, Baiyun Obo (also known as Bayan Obo), is located in the Chinese autonomous region of Inner Mongolia, holds over 83% of China's rare earth reserves and accounts for about 50% of all rare earths output in China. China's other regions with large rare earth reserves are Shandong (7.7%), Sichuan (3%), and a number of provinces in southern China (3%). (**See Figure 3.)** Additionally, it is important to note that the rare earth deposits concentrated within northern China are principally light rare earths (LREEs) while the few and highly sought-after heavy rare earths (HREEs) are located in southern China, particularly in Jiangxi, Guangdong, Fujian, Guangxi, and Hunan provinces. As it stands now, China is the only country in the world that can provide significant quantities of both light and heavy rare earth elements. Mountain Pass mine in California and the Mt. Weld mine in southwestern Australia possess rare earths, but the inventories are mostly light rare earths.[27]

26 Pui-Kwan Tse, U.S. Geological Survey (2011) quoted in Wayne M. Morrison and Rachel Tang, "China's Rare Earth Industry and *Export Regime: Economic and Trade Implications for the United States,"* Congressional Research Service, April 30, 2012, 8.

27 Morrison and Tang, "China's Rare Earth Industry and Export Regime," 8–9.



Source: Plans for Developing the Rare Earth Industry 2009-2015.
Note: Map prepared by Congressional Research Service (CRS).

Figure 3. Rare Earth Reserves in China

F. HISTORY OF THE RARE EARTHS INDUSTRY

While there is no disputing that China dominates the rare earth production market today, the United States was once the world leader in rare earth production and innovation. Up until the 1980s, the United States was the number one producer and technological innovator for REEs in the world, with the overwhelming majority of mining taking place at the Mountain Pass production facility in southwestern California. In 1984, the Mountain Pass mine accounted for the entire U.S. domestic demand and one-third of all global exports of REEs.[28]

Levkowitz provides an authoritative account of China's rare earth industry. He notes that as the United States was the leader of the rare earth market, leaders in Beijing began to realize China's potential to exploit its own resourceful rare earth reserves. On his tour of southern China in 1992, Deng Xiaoping, then

[28] U.S.-China Economic and Security Review Commission, *China's Rare Earths Industry and its Role in the International Market (*November 2010).

the leader of China's Communist Party (CCP), voiced the strategic value of the country's enormous rare earth reserves when he declared, "There is oil in the Middle East and rare earth in China."[29] Towards the end of the 1970s, China's production capabilities significantly improved due to increased government support for developing enhanced mining techniques as well as new research and development (R&D) efforts for rare earth applications. These new initiatives gave China a 40% average increase in rare earth production annually between 1978 and 1989, making it a dominant world producer. Like today, the majority of China's rare earth mining has centered around China's Bayan Obo mine in Baotou, Inner Mongolia.[30]

During China's initial stages of its domestic rare earth production endeavors, many Chinese rare earth mining enterprises were not in the least profitable; however, many companies were able to continue operations with the aid of non-performing loans and other subsidies given to them from Chinese government-controlled banks. Levkowitz points out that this assistance enabled Chinese rare earth mining facilities to produce at low prices, thereby elevating the overall number of exports of rare earths. As a result of these increasing exports throughout the 1990s, global prices plummeted which in-turn drove non-Chinese producers (i.e., United States) out of business. The California based Mountain Pass mine facility was closed in 2002 largely driven by lower-priced competition from Chinese companies. In the end, it left the United States completely dependent on China for its domestic rare earths consumption.[31]

Levkowitz goes on to point out that with the mining of rare earths migrating from the United States to China, so did the production of rare earth oxides, alloys and permanent magnets used in the commercial and military industries.

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[29] Richard Stone, "As China's Rare Earth R&D Becomes Ever More Rarefied, Others Tremble," *Science* 325 (September 2009): 1336.

[30] U.S.-China Economic and Security Review Commission, *China's Rare Earths Industry and its Role in the International Market* (November 2010).

[31] Ibid., 2.

Moreover, the relocation of production to China has also resulted in the United States relinquishing its position as the leading country for research and development in rare earth technologies. As noted by rare earth industry consultant Jack Lifton, even if the United States were able to begin rare earth mining immediately, the degradation of technical expertise would leave U.S. producers incapable of effectively refining rare earths into any functional components. Furthermore, the shortage of experienced researchers would greatly impede any commercial and/or military innovation in rare earth products.[32]

G. ESTIMATED FUTURE SUPPLY AND DEMAND FOR RARE EARTHS

Chinese domestic demand for rare earths has increasingly grown along side China's economy as well as its increased production in technology that require rare earths. In the early years, China's production capacity of rare earths was able to satisfy both domestic and global requirements; however, now analysts assess that China's domestic demand for rare earths will soon meet, if not exceed, its domestic supply.[33]

Hurst uses a number of examples to illustrate China's anticipated increase in rare earth consumption.[34] For instance, in July of 2008, China had 600 million mobile phone users; by March of 2009, less than one year later, China had 670 million users. This trend will likely increase as new technologies continue to develop. Other examples of increased domestic demand for rare earths involve the energy industry. In China, both solar and wind power are expected to increase substantially in the near future. It is estimated that green energy technology is expected to become the largest consumer of rare earths. In China's 2007 energy strategy, the government had a target of 30 gigawatts capacity for wind-power; however, according to Fang Junshi, head of the coal department of

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[32] Ibid., 2.

[33] Ibid., 6.

[34] Hurst, *Institute for the Analysis of Global Security (IAGS),* 19.

the National Energy Administration, China will have 100 gigawatts of wind-power by 2020. China's consumption of rare earths are also expected to increase due as more foreign companies (i.e., United States) move their production facilities to China to take advantage of lower cost rare earths.[35]

The rest of the world, too, will continue to consume rare earths in larger quantities especially as countries recover from the recent global financial crisis and continue to develop and use high-tech products.[36] World demand for REEs was estimated at 136,100 metric tons in 2010, with global production around 133,600 metric tons. The gap is covered by above ground stock. According to the Industrial Minerals Company of Australia (IMCOA), global demand for rare earths will be 185,000 metric tons in 2015. China's production levels may reach 140,000 metric tons per year in 2015 as China's annual demand is assessed to rise to 111,000 metric tons. The Chinese Rare Earth Industry Association, however, estimates China's demand to increase to 130,000 metric tons by 2015. That said, the non-China annual output would need to be between 45,000–70,000 metric tons in order to meet the global demand for rare earths. Although the gap in global demand may be mitigated by new mine production for some light rare earths (i.e., excess supply of cerium, lanthanum, and praseodymium), several predictions show that there will likely be shortages of other light rare earths and many heavy rare earths (i.e., dysprosium, terbium, neodymium, europium and erbium).[37]

Like China, as world demand continues to increase, U.S. demand for rare earths is also estimated to rise. For instance, permanent magnet demand is assessed to grow by 10-16% per year over the next several years while the demand in auto catalysts and petroleum catalysts is expected to grow 6% and

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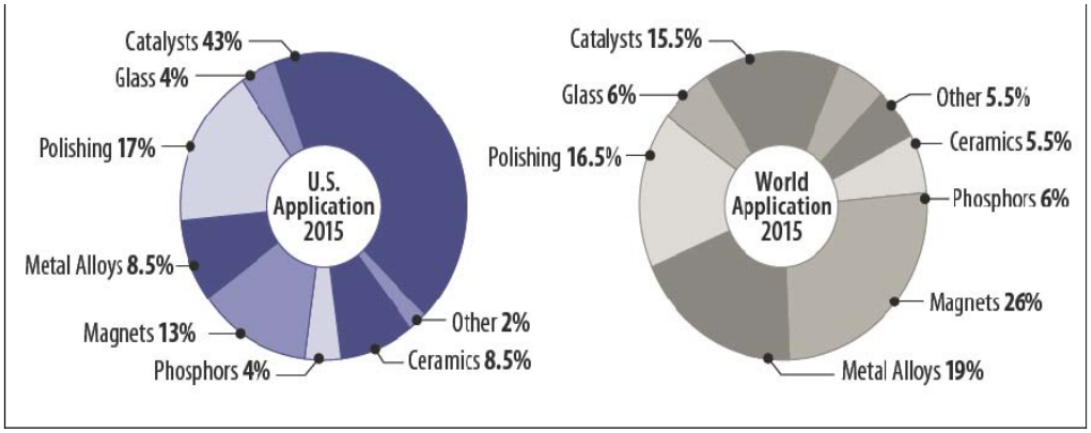
[35] Ibid., 19-20.

[36] U.S.-China Economic and Security Review Commission, *China's Rare Earths Industry and its Role in the International Market (*November 2010).

[37] U.S. Library of Congress, "Rare Earth Elements: The Global Supply Chain," 3–4.

8%, respectively. Likewise, demand for rare earths in hybrid vehicle engines, defense, medical and flat panel displays are also expected to increase.[38] (**See Figure 4.**)



Source: IMCOA, 2011
Note: Figure created by CRS.

Figure 4. Rare Earth Demand by Application-U.S. and World, 2015

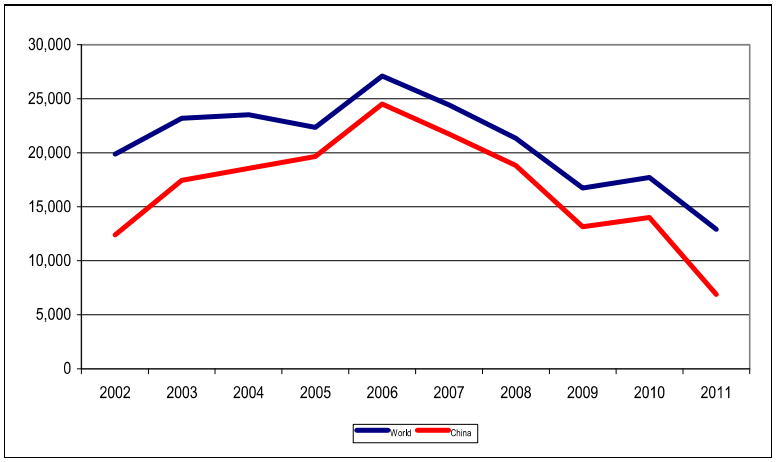
H. U.S. - CHINA RARE EARTH TRADE

As a result of a decade of open free-market trade and non-stringent environmental and safety regulations, China has become the world's dominant producer, user, and exporter of rare earths. In fact, as of 2011, China's trade data indicated that the value of its rare earth exports reached $3.4 billion. As noted by the USGS, China currently accounts for an estimated 97.3% of global mine production of rare earths with many countries including the United States becoming increasingly dependent on China for all varieties of rare earth materials. According to the United States International Trade Commission (USITC), the value of U.S. rare earth imports from the world reached $860 million in 2011 (up from $94 million in 2002). But more importantly, the value of U.S. rare earth imports from China in 2011 totaled $523 million. It is worth noting that

[38] Ibid., 4.

the value of U.S. rare earth imports from China rose by 1,376% between 2002–2011. When measured by quantity, the U.S. dependence on China for its rare earths is important. Over the past decade (2002-2011), the amount of U.S. rare earth imports from China as a percentage of the total U.S. rare earths imported averaged 78.3%.[39]

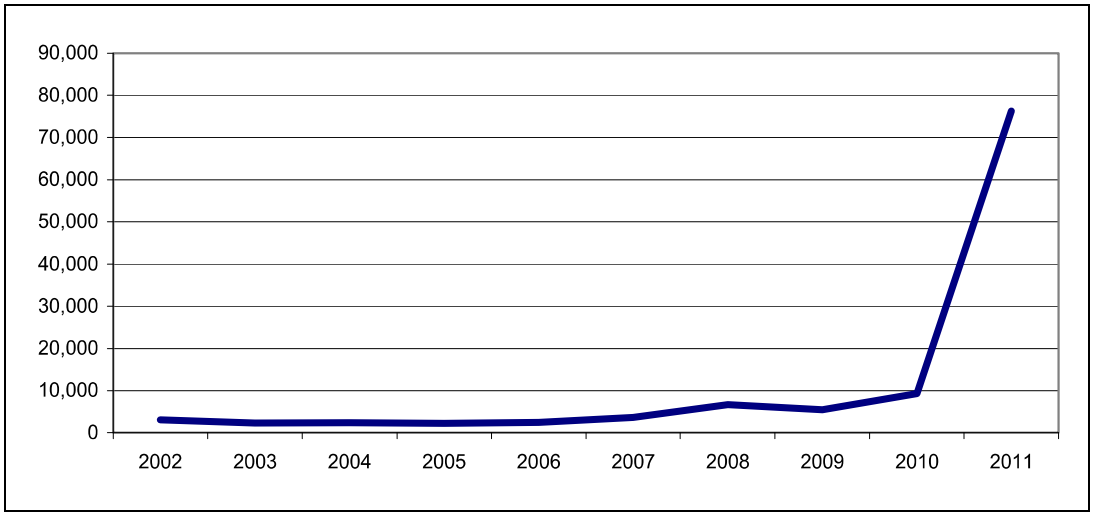
In recent years, however, the quantity of U.S. rare earth imports from China has dropped dramatically. In fact, between 2006 and 2011 U.S. imports from China declined from a high of 24,513 metric tons to 6,884 metric tons (71.9% drop). **(See Figure 5.**) This drop in U.S. rare earth imports was not only attributable to the after effects of the global economic slowdown, but also the rising prices of imported Chinese rare earths. Over the last decade, prices for U.S. rare earths imported from China rose exponentially. In less than a decade (2002-2011), the average U.S. customs value per metric ton of rare earths imported from China rose from $3,111 to $76,239. That is a nominal increase in value of 2,432%. Also noteworthy is the particular increase in rare earth value in 2011 - prices climbed 723% in one year! **(See Figure 6.**)



Source: USITC Dataweb.
Note: Rare earth categories as defined by the U.S. Geological Survey.

Figure 5. Quantity of U.S. Rare Earth Imports from China and the World: 2002–2011 (Metric Tons)

[39] Morrison and Tang, "China's Rare Earth Industry and Export Regime," 4–5.



Source: USITC Dataweb.
Note: Rare earth categories as defined by the U.S. Geological Survey. The data represents average prices for all rare earth imports. Prices for individual rare earth commodities differ significantly.

Figure 6. Customs Value Per Metric Ton of U.S. Rare Earth Imports From China: 2002–2011 ($)

I. CONCLUSION

Over the course of the last 50 years, remarkable changes in rare earth production and, consequently, in distribution, have taken place throughout the world. In fact, over the past two decades, the world has witnessed a seemingly rising China transition from a rather passive rare earth consumer to one marked with extreme dominance and ambition in the global market. Today, with China's rapidly growing economy, and its sharp increase in domestic demand for rare earths, China currently holds the position as the world's largest producer, consumer and exporter of rare earths.

J. GLOSSARY

Alloy: A compound that consists of two or more metals, or metals with a non-metal.

Atomic number: The number of protons in the nucleus of an atom determines the atomic number of the element. The elements of the periodic table are in order by their atomic numbers.

Bastnaesite: A yellowish to reddish-brown mineral that is a source of rare earth elements.

Dysprosium: A widely used rare earth element that helps to make electronic components smaller and faster.

Lanthanides: Also known as rare earth elements. The lanthanide series is the group of elements in which the 4f sublevel is being filled. No other element in the periodic table has these properties.

Minerals: The building blocks of rocks. Geologists define a mineral as: A naturally occurring, inorganic, solid, crystalline substance, which has a fixed structure and a chemical composition that is either fixed or that may vary within certain defined limits.

Monazite: A reddish-brown phosphate mineral that contains rare earth elements.

Neodymium: A rare earth element that is a critical component of strong permanent magnets. Cell phones, portable CD players, computers and most modern sound systems would not exist in their current form without using neodymium magnets. Neodymium-Iron-Boron (NdFeB) permanent magnets are essential for miniaturizing a variety of technologies. These magnets maximize the power/cost ratio, and are used in a large variety of motors and mechanical systems.

NdFeB Permanent Magnets: Neodymium-iron-boron magnets.

Nonferrous metals: Anything (metal, alloy, compound, etc.) that does not contain iron.

Ore: A mineral/rock that contains metal that is valuable enough to be mined.

Oxide: An oxide is any compound of oxygen with another element or radical.

SmCo: Samarium cobalt permanent magnet.

Tailings: The materials left over after the process of separating the valuable fraction from the worthless fraction of an ore.

Terbium: A rare earth element used in energy efficient fluorescent lamps. There are various terbium metal alloys that provide metallic films for magneto optic data recording.

Yttrium: A rare earth element. Almost every vehicle on the road contains yttrium based materials that improve the fuel efficiency of the engine. Another important use of yttrium is in microwave communications devices. Yttrium-Iron-Garnets (YIG) are used as resonators in frequency meters, magnetic field measurement devices, tunable transistors and Gunn oscillators. Yttrium goes into laser crystals specific to spectral characteristics for high-performance communication systems.

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III. INTERNATIONAL RELATIONS THEORY PREDICTIONS AND THE STUDY OF ECONOMIC STATECRAFT

A. INTRODUCTION:

With China's recent unprecedented economic rise, People's Republic of China (PRC) leaders have begun to think about the future of international relations and how China's international role should change in the foreseeable future. How should China's senior political and economic officials put the state's quickly growing power to use?[40]

Are China's rare earth policies being implemented such that international actors including the United States are compelled to behave in a specified manner (as would be predicted by. structural realism) or are China's actions fostering co-operative power (as predicted by neoliberal institutionalism)? Both theories are feasible; however, only one theory truly explains the actions China has initiated recently surrounding its rare earth policies with the United States. As such, this chapter will examine these two principal international relations theories as basic frameworks in order to assess whether China is using its rare earth policies as a tool of economic statecraft.

The chapter opens by showcasing a theoretical table that highlights two competing views in China's rare earth industry. Also embedded within this table are basic theory predictions that characterize China's behavior associated with its rare earth element (REE) policies. The remaining sections introduce key terms, definitions and concepts attached to two prominent international relations theories, economic statecraft, and interdependence.

B. THEORY PREDICTIONS ON CHINA'S RARE EARTH BEHAVIOR

The centerpiece of this chapter is illustrated in the theoretical table, below, which I have constructed for the purpose of this thesis. The primary purpose of

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[40] Daniel Lynch, "Chinese Thinking on the Future of International Relations: Realism as the Ti, Realism as the Young?*," *The China Quarterly* (March 2009).

this table is to offer predictions of multiple policy actions we would expect China to take in the REE industry on the basis of both structural realism and neoliberal institutionalism. Beyond the above policy predictions, the table also contains key reactions the United States would likely take in response to China's behavior attached to rare earth trade.

Table 2. Alternative Viewpoints on China's Strategic Intent in the REE Industry

Structural Realism / Economic Statecraft	**Neoliberal Institutionalism / Interdependence**
Intent: China intentionally threatens the United States with its near-monopoly on rare earths by exercising multiple policy options.	**Intent:** China liberalizes its international trade policies in an attempt to foster continued economic growth and development in its rare earth industry.
China's Action #1: Imposes export quotas. **U.S. Reaction #1:** United States resource dependency forces the state to purchase rare earths at higher prices. **U.S. Reaction #2:** United States foreign technology firms are forced to move its manufacturing to China. **U.S. Reaction #3:** United States is forced to develop or re-open its domestic production facilities enabling continued consumer product deliverables. **U.S. Reaction #4:** United States is forced to buy rare earths from international suppliers other than China.	**China's Action #1:** Chinese government implements free trade and fair access to all rare earth supplies. China moves forward and abides by all international trading regulations including the WTOs stipulated rules. (With China claiming that its export restrictions are aligned with their domestic production and consumption restrictions, the likelihood for a litigation by WTO is minimized and greater international cooperation is anticipated) **U.S. Reaction #1:** United States drops WTO claim of charging China with unfair rare earth trade practices. **U.S. Reaction #2:** United State purchases rare earths at market prices.
China's Action #2: Imposes export licenses. **U.S. Reaction:** United States is forced to purchase rare earths at higher prices due to supplemental requirements. **China's Action #3:** Imposes export Duties. **U.S. Reaction:** United States is forced to purchase rare earths at higher prices due to supplemental fees	**China's Action #2:** Chinese government cooperates with the broader international community including the United States by offering its assistance in recycling rare earths and developing valuable substitutes for the metals. **U.S. Reaction #1:** United States prodigiously expands its domestic rare earth recycling industry and rapidly modernizes its capabilities in developing rare earth alternatives.

China's Action #4: Mandates domestic stockpiling. **U.S. Reaction:** United States is forced to purchase rare earths from international suppliers other than China.	
China's Action #5: Chinese government requires technology in exchange for rare earths. (i.e., production of value-added goods) **U.S. Reaction:** United States foreign technology firms are forced to move its manufacturing to China.	
China's Action #6: Mandates rare earth industry-wide consolidation program. **U.S. Reaction:** United States is forced to purchase rare earths via imports at higher prices.	
China's Action #7: Chinese government imposes more stringent environmental laws applicable to rare earths. **U.S. Reaction:** United States is forced to purchase rare earths via imports at higher prices.	

C. STRUCTURAL REALISM OR NEOLIBERAL INSTITUTIONALISM:

The following section taken largely by Robert Powell's work in "Absolute and Relative Gains in International Relations Theory", will illustrate the core difference between *structural realism* and *neoliberal institutionalism.*[41] Having an understanding of each theory will not only help to better predict China's behavior associated with rare earths it will also assist in building a comparative assessment of China's strategic intent in the rare earth element industry. In order to fully grasp the meaning behind both theories, a better understanding of the terms absolute and relative gains must occur. Neoliberal institutionalism theory emphasizes that states are concerned with their absolute gains and care less about the relative gains of other nations. The theory focuses upon the manner of cooperation between states which function in an international environment. In the

41 Robert Powell, "Absolute and Relative Gains in International Relations Theory," *The American Political Science Review* 85, no. 4 (December 1991).

case of China's rare earths, neo-liberal theory would suggest that it does not matter whether the United States or China benefits more from the exchange of a particular commodity. Ultimately, what is of consequence is that China has improved its economic position. In the frame of neoliberal institutionalism theory, China would only be concerned with making a profit on the commodity; the U.S.'s outcome would be irrelevant. Conversely, according to structural realism or neorealism, states are concerned with relative not absolute gains. Often times, a state's utility in structural realism is a function of a relative measure like power. In structural realism, both states could conceivably experience a gain; however, more gains for one state will tend to be seen as a loss for the other state. This particular theory would emphasize that China has improved its relative economic position to that of the United States and that this is what China cares about. Furthermore, the theory would likely predict U.S. opposition to China's restrictive measures on export quotas claiming unfair trade practices that are not in compliance with existing World Trade Organization (WTO) regulations. As a result of these measures, China's domestic commercial actors would experience relative gains over the United States due to the escalation of rare earths prices levied against international consumers. Thus, all else being equal, the more a state cares about relative gains, the less likely any form of international cooperation will occur.[42]

Under neoliberal institutional theory, Beijing's international trade policies associated with rare earths would be geared toward enhancing economic cooperation and development. In other words, if Beijing's policy actions were in line with neoliberal institutionalism theory, Beijing would move forward in one of two predicted paths. First, Beijing would forego all restrictions on imposing rare earth export quotas in an effort to promote open trade on the international free market. Through the analytical lens of this theory, Beijing would continue to pursue free and fair access to its rare earth supplies through the use of its existing policies. Likewise, its government would continue to abide by all

[42] Ibid., 1303.

international trading regulations including the WTOs currently stipulated rules. Alternatively, if Beijing did not engage in the above policy action, its government would likely respond by seeking continued cooperation with its international trading partners (i.e., U.S. rare earth consumers) through assistance in rare earth recycling or by providing substitutes for these valuable resources. (**See Table 2.**) Either way, both policy actions administered by Beijing would emphasize trade cooperation and collaboration as opposed to policy choices intended to economically harm another state in favor of boosting its own national strategy.

Having defined the two primary theories for this study, the remainder of the chapter will identify interdependence and provide a useful definition for the term economic statecraft.

D. WHAT IS INTERDEPENDENCE?

The primary reason for identifying the term interdependence in this study is to provide us with an alternate principal that is inversely related to the economic statecraft principal. As denoted in the above table, both interdependence and economic statecraft are paralleled with a corresponding theory. If one is able to understand these basic principals, then assessing China's strategic intent becomes more transparent. So what is interdependence and does this principal correlate with China's recent policy actions tied to its REE sector?

According to Robert Keohane and Joseph Nye, interdependence is most simply defined as "mutual dependence."[43] More specifically, Keohane and Nye define interdependence as the following: "situations characterized by reciprocal effects among countries or among actors in different countries."[44] In this particular study, the above-mentioned effects will result from international transactions in the form of goods (i.e., rare earths) between China and the United

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[43] Robert O. Keohane and Joseph S. Nye*, Power and Interdependence* (Harper Collins, 1989), 8.

[44] Ibid., 8.

States. As Keohane and Nye point out in their book *Power and Interdependence*, interdependence only exists if there are reciprocal costly effects between two countries making an international transaction.[45] In the context of this thesis, both China and the United States would share some degree of cost if an international transaction were to take place. For instance, if China were to export rare earths to the United States, its cost would be the loss of valuable resources while the United States would invariably incur the cost of paying for these commodities. Alternatively, interdependence is not characterized as being an equally balanced mutual dependence between two states. Instead, Keohane and Nye assess that asymmetries in interdependence develop which provide sources of influence for states. In other words, less dependent states are often able to use the interdependent relationship as a source of power (i.e., control over resources).[46] In this study, even if one presumes that China is the less dependent state of the two as Washington relies heavily upon Beijing for the availability of rare earth resources, the question remains as to whether China's rare earth policies are used as tools of statecraft or interdependence.

In order to truly understand the term interdependence and the role it has within international relations, it is also important to define the word *vulnerability.* According to Keohane and Nye, vulnerability can be defined as "an actor's liability to suffer costs imposed by external events even after policies have been altered."[47] In this thesis, the United States' vulnerability to actions by China's rare earth exporters would be largely determined by the effectiveness of its altered policies. For example, if the United States' new policies (i.e., purchasing rare earths from domestic suppliers or foreign suppliers outside of China) could bring sufficient quantities of rare earths at lower costs, than United States vulnerability would be mitigated. In other words, just because the United States imports nearly all of its rare earths from China does not indicate U.S. vulnerability; only by

[45] Ibid., 9.

[46] Ibid., 11.

[47] Ibid., 13.

knowing what it would cost in terms of time and money to obtain such substitutes can vulnerability interdependence be established.[48] I would argue that vulnerability is important because this dynamic is essential for understanding the political framework of interdependent relations. As Keohane and Nye note, "it focuses on which actors are the definers of the ceteris paribus clause, or can set the rules of the game."[49] Although it is difficult to prove, it appears vulnerability asymmetries are in favor of China. When a comparison is done between the two countries, China's alternatives to imposing export quotas on rare earths (such as supplying rare earths to domestic manufacturers) are more attractive than the United State's alternatives to importing rare earths from China (rare earth production and consumption from domestic mines and rare earth imports from foreign sources excluding China).[50]

The last element crucial to the fundamentals of interdependence is what Keohane and Nye call *complex interdependence*. In essence, complex interdependence is the opposite of economic statecraft. Take a government's domestic activities for instance. As a state's domestic economic policies grow and become more complex, they begin to overlap and impinge on the state's foreign economic policies. In the context of this particular study, it would be akin to China altering its foreign economic policies (i.e., imposing export quotas on rare earths) as a result of its own domestic policy trade regulations. By forcing its own mining companies to obtain new licenses and limit its own internal rare earth production capabilities, it would only be logical for Beijing to then change its international economic policies.[51]

In the context of this study, interdependence would suggest that Beijing would employ rare earth policies to further its economic prosperity through

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[48] Ibid., 15.

[49] Ibid., 15

[50] Ibid., 16.

[51] Ibid., 26.

enhanced international cooperation. Conversely, employing an economic statecraft approach would suggest diminishing international cooperation via deliberate economic manipulation. In other words, employing specific REE policies that deliberately strengthen China's economic prosperity and strategic interests while forcing the United States to suffer economically. In interdependence, China's strategic intentions could be attained but only if it were cooperating with an international actor such as the United States. If China used its rare earth policies as a tool of economic statecraft, it could attain its strategic interests, but it would be at the expense of any international cooperation. **(See Table 2.**)

E. WHAT IS ECONOMIC STATECRAFT?

Prior to defining the term economic statecraft, it is important to realize that this principle is closely related to structural realism. Although structural realism is a theory, both terms are centered on attaining economic gains at the expense of another state. Furthermore, both terms are geared toward seeking strategic interests through economic manipulation. Economic statecraft denotes the use of policy to fulfill the main goals of nation-states in the international scheme. According to David Baldwin, "statecraft is most usefully thought of in broad and multidimensional terms."[52] By definition, "it involves the application and interplay of multiple instruments - military, economic, diplomatic, and informational - to achieve the multiple objectives of states, including national security, economic prosperity, and political prestige and influence."[53] Although this definition is not incorrect and in the practice of international relations, states do seem to utilize the interplay of multiple instruments, this perspective is entirely too broad. Thus, for purposes of this thesis and my contribution to answering the question as to what extent China uses rare earth policies as a tool of economic statecraft, I will

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[52] Michael Mastanduno, "Economics and Security in Statecraft and Scholarship," *International Organization* 52, no. 4 (1998).

[53] Ibid., 826.

narrow Baldwin's definition to include only *economic* interaction among states to achieve *economic* prosperity. As such, I follow William Norris in defining *economic statecraft* as the deliberate use of economic manipulation pursued by a state (i.e., foreign policy makers) to influence the economic behavior of both its domestic and international actors.[54]

Defining economic statecraft in these terms enables us to be more accurate about the conditions by which states attempt to use economic interaction to promote their national objectives.[55] Baldwin seems to add some utility in the definition of economic statecraft in the following statement: "influence attempts relying primarily on resources which have a reasonable semblance of market price in terms of money."[56] It is in these words, where he effectively illustrates the economic significance in which states interact with other international actors in an effort to attain their own economic strategic goals. For example, by China deliberately manipulating the market price of rare earths by imposing export quotas on U.S. firms operating in China, its government is able to strengthen its own economic interests. Thus, when characterizing economic statecraft, it is important to address both the state's impact on the international system and its influence with its own domestic enterprises.[57] Together, these two elements help accurately define a useful definition of economic statecraft. Having defined economic statecraft, interdependence, and specified the two broad international relations theories, the next task is to more explicitly consider how countries conduct economic statecraft.

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[54] Norris, "Economic Statecraft with Chinese Charachteristics," 19.

[55] Ibid., 23.

[56] David A. Baldwin, *Economic Statecraft* (Princeton: Princeton University Press, 1985).

[57] Norris, "Economic Statecraft with Chinese Charachteristics," 23.

F. HOW DO WE KNOW IF COUNTRIES ARE PARTICIPATING IN ECONOMIC STATECRAFT?

In order to determine whether countries are participating in economic statecraft, it is critical to examine the various types of leverage one state can apply to another. Klaus Knorr defines leverage as "one actor using a lever to gain advantage over another actor."[58] He goes on to say that countries can use their economic capabilities as a tool of economic statecraft through four basic methods: *coercion; weakening other economies; attaining monopolist market power; and achievement of general influence*.[59] Knorr identifies the following four elements of economic power.

The first method of economic power, and arguably the most important within this study, is *coercion*. An example of coercive economic statecraft would involve China intentionally withholding or threatening to withhold the supply of rare earths in an effort to compel an international actor (i.e., United States) to behave in a specified manner. By using structural realism theory as a basic framework, seven possible policy actions by China become apparent. Structural realism predicts these outcomes as all seven policy actions share a common trait. That is each action employed by China denotes an act of economic manipulation in order to influence the economic behavior of either its domestic enterprises or an international actor. Furthermore, the structural realism theory presupposes that relative economic gains would be attained by China while the United States would be forced to react at a cost. (**See Table 2.**)

The first reaction in table two predicts that the United States will respond by purchasing rare earths at higher prices. By China's action to impose rare earth export quotas, fewer commodities would be available to trade on the market resulting in higher demand and increased prices. Should the United States be

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[58] Klaus Knorr, "International Economic Leverage and its Uses" in *Economic Issues and National Security*, ed. Klaus Knorr and Frank N. Trager (Lawrence, Kan.: The Regents Press of Kansas, 1977), 99.

[59] Ibid., 99-100.

compelled to take this option, China would be in a better relative position as its domestic consumers would experience considerably lower prices.

A second predicted reaction by the United States as a result of resource supply limitations would encompass moving its hi-tech manufacturing firms oversees to China or order to obtain access to low-cost rare earths. Similar to the above reaction, this response would also give Beijing a relative economic advantage as valuable U.S. technologies would be transferred to China in exchange for rare earths.

A third predicted reaction would involve relying on domestic production mining centers. By forgoing the purchase of expensive rare earths, the United States would be forced to invest in massive domestic infrastructure as its rare earth production facilities are currently in their infancy stages. This policy option would clearly favor Beijing as its action would force the United States to spend an immense amount of funding to cover the internal costs of rare earth exploitation.

Finally, by utilizing structural realism theory as a framework to predict China's behavior and likely U.S. responses, there is the possibility for the United States to purchase rare earths from international suppliers other than China. Although this option is the least abrasive form of economic statecraft, it does still give China a competitive advantage as the cost to buy rare earths will invariably be higher for the United States.

The second method of economic power is *weakening other economies*. This method entails directly impacting another state's economic security and/or capabilities without any effort to make it behave in a certain way. In the case with China's rare earth policies, the state could conceivably withhold the supply of rare earths in an effort to ensure the United States does not have the necessary rare earth components to manufacture specialized military weapon systems. In this instance, China's withholding of rare earths would be implemented in order to weaken the United States' military capabilities.[60]

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[60] Ibid., 100.

The third form of economic power applicable to this study is the use of attaining a *monopolist market power* in the international economy. Within the context of this study, China would exercise the use of its monopoly power by restricting export quotas on rare earths in order to achieve high economic profits.

Lastly, the final form of economic power a state can wield is its achievement of general influence. In other words, a state possesses the capability to influence another state through its own economic policies. China in this instance could influence the economic behavior of the United States simply by withholding its supply of REEs.[61]

G. STATE MANIPULATION OF COMMERCIAL ACTORS

As defined by William Norris' work, *Economic Statecraft with Chinese Characteristics: The Use of Commercial Actors in China's Grand Strategy*, economic statecraft takes place when states not only influence the behavior of international actors via economic means but also through the influence of its domestic commercial actors.[62] Despite the inherent phenomenon of commercial actors acting on their own interests, states often create various incentives for commercial actors so that in the end a state's overarching national strategic objectives can be achieved. By acting in such a manner, states can pursue strategies by managing the incentives of its commercial actors.[63] In the context of this study, this approach would be akin to China giving rare earth price breaks to its domestic industries by waiving licensing fees or duties while imposing these expenses on an international firm.

As for the relation between this phenomenon and economic statecraft, I would submit that economic statecraft could not exist without a state's ability to influence its domestic actors. Conversely, interdependence matters less when explaining this phenomenon. To be sure, states do rely on their domestic rare

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61 Ibid., 123-125.

62 Norris, "Economic Statecraft with Chinese Characteristics," 58–59.

63 Ibid., 58.

earth enterprises for revenue; however, it is the effectiveness of a state's influence or economic control on its domestic partners that truly allow a state to attain its strategic objectives.

Thus, in order to truly understand economic statecraft, one must examine how a state manipulates the economic activities of its domestic commercial actors. How do states control domestic actors who are responsible for producing these strategic goals? I follow Norris in observing that if China were to conduct economic statecraft, the state must be able to provide incentives to its commercial actors in a manner that is compatible with the governments' own national interests. Thus, a government's capability to manipulate and control its domestic actors becomes directly relevant when depicting economic statecraft.[64]

This next section advances the work done by William Norris in his dissertation entitled, *Economic Statecraft with Chinese Characteristics: The Use of Commercial Actors in China's Grand Strategy.* Specifically, Norris highlights a framework that depicts five fundamental factors that are necessary in determining whether or not a state is capable of controlling its domestic economic actors. His work is important to this thesis as it lays out the fundamental principles necessary for economic statecraft to occur. On the basis of his work, I will apply a structured assessment using predicted rare earth policy actions to determine the extent to which China is using its policies as a tool of economic statecraft. Similarly, I will expand his work in order to assess China's future strategic intentions and power status as a rising economic nation.

First, and arguably the most important, is the compatibility of goals between the state and the commercial entity. If the basic goals of the state are closely in line with the goals of the commercial actor, then one would presume that more cooperation would occur. In this instance, the objectives of the commercial actors are compatible with the state's goals. (i.e., financial profits, productivity improvements, market development, etc.) Thus, the state is more

64 Ibid., 58.

easily able to attain its national strategic interests since its goals are complementary to the commercial actors' objectives. In the end, when a state's goals are compatible with those of the commercial actors, the state will find it simpler to control or manage commercial actors in its quest of strategic objectives.[65]

Second is overall market organization or structural arrangement within the economic system. When markets are highly fragmented, state control becomes difficult to manage. Moreover, as the number of commercial actors increase, a state's ability to monitor and enforce compliance becomes incrementally more difficult. Conversely, the higher the market's concentration comprising fewer companies, the easier it is for a state to control their behavior. Thus, if there are too many commercial actors, the state will likely have difficulty managing them, while too few will create dominant commercial actors impeding government initiatives to control their actions.[66]

Third, is the extent by which the state represents one unified position. For if the government is divided, state control over its commercial actors diminishes. Any situation where there are competing political authorities or the state encounters opposing factions, it will be more challenging to manage commercial actors. For example, anytime the central government must contend with provincial and local authorities, states will find it hard to use commercial actors to pursue its strategic interests. Furthermore, when the state is separated by competing political factions, commercial actors can exploit one set of interests off each group that in turn weakens the state's ability to control the commercial actors.[67]

The fourth factor is the relationship between the state and the commercial actor. More precisely, the relationship between both entities ultimately depends

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[65] Ibid., 61.

[66] Ibid., 61.

[67] Ibid., 62.

on the following three characteristics: 1.) disposition of ownership arrangement, 2.) management structure, and 3.) financing structure. The fewer obstacles and more direct the relationship between the state and the commercial actors, the easier it will be for the state to control the commercial actor. For instance, when the state directly owns an enterprise, one would anticipate more efficient control. Likewise, companies whose managers are directly hired by the state are more easily managed than an enterprise whose managers are elected by private shareholders. With the anticipation of China's probable rare earth industry consolidation and the shift toward state ownership, China's government will likely encounter less resistance and experience easier control of its commercial actors. Lastly, companies who primarily rely on state authorities for their financing are more likely to meet the governments' interests than one bound to private shareholders.[68]

Lastly, the fifth factor is the relative distribution of resources between the state and the commercial actors. When states possess large budgets, experienced monetary authorities, and are capable of effectively executing commercial activities, one would presume a high degree of commercial actor(s) control. Challenges in exercising economic statecraft are generally overcome when states are able to build an advanced infrastructure capable of monitoring and regulating the commercial actors. Conversely, if the commercial actor such as a Chinese domestic rare earth firm possesses relatively greater finances, one would expect greater autonomy from the firm and less control by the poorly resourced state. Thus, a state's ability to exercise close control over the commercial actor is largely dependent upon the difference present in the overall level of resources available.[69]

As suggested earlier, all of the above factors Norris identifies are crucial aspects to economic statecraft as each component helps to assess the success

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[68] Ibid., 63.

[69] Ibid., 64.

or failure of a state to influence the behavior of its domestic actors. Without having any indicators to measure a states' success in controlling its domestic industries, a valid assessment on China's use of rare earth element policies could not be determined. However, by having a clear understanding of Norris' previously described factors and how they relate to statecraft, my contribution in identifying Chinese behavior in rare earths becomes possible. Having delineated how a state implements control over commercial actors, the next objective is to consider how this control relates to successful economic statecraft.

H. THE EFFECTIVENESS OF ECONOMIC STATECRAFT

In this final section, Norris' framework on the effectiveness of statecraft augments my study by expanding on the fundamentals of economic statecraft. His work captured below not only identifies the conditions by which statecraft is successful, but more importantly helps us to further understand the relationship between a state and both its domestic and foreign actors. By better understanding the circumstances in which statecraft is successful, I can more easily predict the policy actions China would employ in order to attain its strategic interests.

Although economic power is often a challenging mechanism of international power to exercise, when it does take place it can be extremely effective. What are the defining factors that account for a countries successful use of economic statecraft? Why at times do some states realize their national goals by utilizing economic statecraft and others fall short? In other words, why does economic statecraft succeed?[70]

Although state control of domestic commercial actors (i.e., rare earth consumers, producers, suppliers) is imperative for economic statecraft to unfold, constraint alone is not sufficient enough to assure the success of a countries' strategic goals. Beyond a states' control of its commercial actors, states must

[70] Ibid., 65.

also fulfill three additional conditions. The first condition that determines whether or not economic statecraft is likely to succeed depends on how the outcome matches up with the target state's own objectives. In other words, the strategic ends desired can not be greater than the economic means available to realize those ends.[71] Thus, economic statecraft with a more conservative national objective directed against a less confrontational state will be more successful than a government who possesses unrealistic goals directed against a state whose position is not favorable with the intended objective. Put differently, economic statecraft is successful only when the ends are in line with the means. Conversely, when the goals are not in proportion to the economic tools levied against the target state, economic statecraft will likely be unsuccessful.[72] For instance, if China were to promote a strategy of rare earth resources in exchange for technology (conservative national objective; strategic ends) by imposing export quotas (economic means) against a non-aggressive state, the probability of success for economic statecraft would be high.

The second condition is the relative scale of the economic interaction. For example, a country whose trade consists of the majority of its GDP will be significantly more affected by disruptions than those whose trade equates to a small percentage of their overall economy. All else equal, the relative scale of a state's economic interaction must be fairly substantial in order for economic statecraft to be an effective tool.[73]

The third factor that measures a state's overall effectiveness in economic statecraft is its elasticity of demand among economic interaction between two countries. In the context of this condition, higher inelasticity equates to more effective economic statecraft.[74] An example of this factor would involve U.S.

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[71] Ibid., 65.

[72] Ibid., 65.

[73] Ibid., 66.

[74] Ibid., 66-67.

actors being dependent on Chinese rare earths, as substitutes for these resources are often difficult to obtain. Therefore, effective economic statecraft has a greater likelihood of success if the state seeks moderate goals and possesses fairly large inelastic economic interaction.

The fourth and final factor for determining a state's overall effectiveness in economic statecraft is its ability to control economic interaction. To be sure, states wield their economic policies on international actors in order to attain national objectives; however, the degree to which a state is able to control its domestic economic interaction matters as well. The magnitude by which a state is able to control its economic interaction is largely a function of its domestic economic structure. In other words, states, especially China, choose to organize their domestic economies via a series of government-business relationships. Moreover, it is the nature of these domestic relationships that often governs the extent by which the state has control over its economic interaction with international states. Thus, states who possess more control over their domestic economy will be better able to direct their economic interaction and far more likely to attain success in their efforts to engage in economic statecraft.[75] For purposes of this study, Beijing is likely to be effective in its attempts to engage in economic statecraft as many if not all of its rare earth businesses in China are or will become state-owned enterprises (SOEs). However, despite the above claimed assessment, states with centrally planned economies are also less efficient in economic productivity. As time passes, this lower economic productivity restrains the size of a countries' overall economy. In the end, the smaller a state's economy, the less economic power a state has to wield. Thus, following Norris, I would argue that although a state requires the ability to direct its economic power for economic statecraft to be effective, too much state intervention tends to lead to inefficiency and a less capable economy over time. Likewise, when the state has a very limited role within the country, the economy

[75] Ibid., 67.

could grow immensely but the state would find it exceedingly difficult to control economic power.[76]

I. CONCLUSION:

This chapter put forward three important perceptions that offer analytic leverage for considering economic statecraft. First, economic statecraft is properly understood through the context of defining two prominent international relations theories—structural realism and neoliberal institutionalism. By qualitatively measuring the extent to which the predictions of these theories are borne out and using each as a basic framework to predict China's rare earth policy actions, we can further assess the extent to which China is using its rare earth policies as a tool of economic statecraft.

Second, in order to predict China's future rare earth policies, we must have a clear understanding of the mechanisms required for China to control its economic power. By having a fundamental understanding of these relationships, we can better place Chinas' REE policies with an appropriate theory.

Third, beyond the close examination of a state's international economic interaction and its control over its domestic commercial actors, we were able to identify the conditions by which effective statecraft occurs. After analyzing the conditions of successful statecraft, better predictions of China's rare earth policy actions can occur and more accurate assessments can be established as to China's long-term strategic intentions.

In short, by stipulating the two theories basic frameworks and accurately defining economic statecraft including its conditions for success, an appropriate assessment of the strategic goals of China's rare earth policies can be developed. The empirical chapter that follows not only defines China's rare earth policies, but it also provides three illustrative stories that attempt to substantiate

[76] Ibid., 68.

how China’s policies are being utilized as a tool of economic statecraft as opposed to a measure of interdependence.

IV. RARE EARTH POLICIES: STRUCTURED ASSESSMENT

A. INTRODUCTION

Within the last few years, China's management of its rare earth policies has attracted the attention of many international actors within the global economic environment. In particular, China's place as the world's top producer and supplier of rare earths and its recent policies including imposing export quotas have raised considerable concern for Washington. The U.S. government has often challenged China's policy measures stating that its actions could weaken the competitiveness of U.S. firms as well as raise rare earth prices. Still others are cognizant of the possibility that China's near-monopoly over its rare earths could be used as leverage against the United States.[77]

Despite the United States being the dominant leader in rare earth production in the late 1980s, favorable policies implemented by the Chinese government and weak environmental standards enabled China to become the new leader in rare earth supply. Today, numerous analysts submit that China's recent policy initiatives to reduce exports and consolidate the industry are intended to promote domestically produced hi-tech value added products. Moreover, others argue that China's reason for implementing strict rare earth export policies are to compel foreign companies (i.e., United States) to move its facilities to China with the ultimate intent of transferring its technology to Chinese businesses. China conversely denies that its rare earth policies are used for political purposes or as a tool of economic statecraft. Rather, China submit that it is exercising these new policies simply to address environmental concerns in China and to better manage and conserve non-renewable natural resources.[78]

The purpose of this chapter is to effectively articulate through qualitative measures the strategic intention behind China's rare earth policies. To that end,

77 Morrison and Tang, "China's Rare Earth Industry and Export Regime," 1–2.

78 Ibid., 1–2.

the three illustrative stories enclosed will attempt to highlight various views and perspectives to help answer the question as to whether or not China's rare earth policies are being utilized as a tool of economic statecraft.

B. CHINA'S RARE EARTH INDUSTRY POLICIES: STATECRAFT LEVER?

This table lays out seven major rare earth policy initiatives that China has attempted to implement in recent history, as identified by Morrison and Tang, and each discussed in more detail in the section below.[79] The table's purpose is to qualitatively measure China's strategic intentions by linking its key policy actions with the designated organization responsible for regulating the policy, the stated long-term goal, and the magnitude of the statecraft lever. Although all seven policies disclosed below are critical components in identifying China's strategic intentions, it is worth noting that each policy has varying degrees of statecraft leverage. For example, since the policy of imposing export quotas had the most influence on the economic behavior of its domestic and international actors, it received the highest magnitude of statecraft leverage. Conversely, stockpiling received a score of (2) as this policy action had minimal influence on the behavior of its actors.

[79] Ibid., 12–20.

Table 3. China's Rare Earth Industry Policies

Date	***Policy Name***	***Organization/ Committee***	***Stated Goal***	***Statecraft Lever?*** Lever Magnitude: 1-2 = Low 3 = Moderate 4-5 = High
2006-2012	(1) Export Quotas	Ministry of Land and Resources (MLR)	Protect and rationally utilize domestic rare earths while mitigating environmental damage	Yes; High statecraft; (5)
1980-2012	(2) Environmental Laws: (i.e., Rare Earth Industry Pollutant Discharge Standards)	Ministry of Environmental Protection (MEP)	Coordinate rare earth development and utilization with environmental protection	Yes; High statecraft; (4)
2006-2012	(3) Export Licenses	Ministry of Commerce (MOC)	Enhance domestic revenues by limiting joint venture licenses; maintain stricter environmental standards	Yes; High statecraft; (4)
2007-2012	(4) Export Duties	Ministry of Commerce (MOC)	Manage and control the variety and quantity of rare earth products leaving China	Yes; High statecraft; (4)
2002-2012	(5) Technology for Resources	National Development and Reform Commission (NDRC)	Expand China's rare earth industry to the more elaborate processing sectors	Yes; Moderate statecraft; (3)
2009-2012	(6) Industry Consolidation: (i.e., Plans for Developing the Rare Earth Industry 2009-2015)	Ministry of Land and Resources (MLR)	Establish three rare earth production districts and two production systems; create a unified front for the entire Chinese rare earth industry	Yes; Moderate statecraft; (3)
2008-2012	(7) Stockpiling	Rare Earth High-Tech Zone Management Committee	Regulate rare earths pricing and help ensure future supplies	Yes; Low statecraft; (2)

C. CHINA'S RARE EARTHS' POLICIES: STATECRAFT INTERVENTIONS

The Chinese government has implemented several policies to manage rare earth production as well as control exports. While some policy measures seem to be aimed at more internal control, others appear to influence the behaviors of its international customers such as the United States. Many of China's policies such as export quotas, duties, and license requirements have caused significant concerns throughout the world as these restrictions not only skew global trade of raw materials but also gives Chinese companies cheaper access to rare earths.

In 2006, China started to decrease its rare earth exports, claiming increased domestic demand and environmental degradation concerns. As a result of these actions, critical supply uncertainties were created among key industries worldwide and significant price increases were noted beginning in 2009.[80]

As of 2008 and 2009, the Chinese government started to initiate regulations to ensure greater control over the rare earth industry. For instance in 2008, China's Ministry of Land and Resources (MLR) issued the *Guidelines for Development of National Mineral Resources 2008-2015.* This new directive was expressly created with the intention to protect and rationally utilize China's valuable natural resources for the period between 2008-2015. This development plan not only designated rare earths as protected minerals but its exploitation and production was also to be strictly controlled by the government.[81]

As noted by Morrison and Tang in their most recent Congressional Research Service (CRS) report, *China's Rare Earth Industry and Export Regime: Economic and Trade Implications for the United States,* the Chinese government has attempted to implement the following seven key rare earth policy measures:

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[80] Ibid.,12.

[81] Ibid., 12.

(1) export quotas; (2) environmental laws (3) export licenses; (4) export duties; (5) technology for resources; (6) industry consolidation; and (7) stockpiling.[82] **(See Table 3.)**

1. Export Quotas

Of greatest concern to the international community, particularly the United States, the Chinese central government has been imposing export quotas in order to have enough resources for its own industries and to regain control of its domestic production. It is important to note that all annual quotas mandated by China are allocated to domestic companies and joint ventures with foreign investors. Between 2005-2010, total quotas have decreased nearly every year as China's internal demand for rare earths has significantly increased. Moreover, joint ventures with foreign investors have seen their allotted quotas cut more severely than their counterparts, particularly after 2009.[83] (**See Table 4.**)

Table 4. China's Export Quotas on Rare Earths

(metric tons)

	2005	2006	2007	2008	2009	2010	2011	2012
Domestic	48,010	45,000	43,574	34,156	31,310	22,513	22,712	N/A
Joint Venture	17,570	16,070	16,069	15,834	16,845	7,746	7,472	N/A
Total	65,580	61,070	59,643	49,990	48,155	30,259	30,184	31,130

Sources: China Rare Earth website (http://www.cre.net/show.php?contentid=97130, as viewed on February 28, 2012): 2009-2011 Rare Earth Export Quotas; Pui-Kwan Tse, China's Rare Earth Industry, U.S. Geological Survey, Open File Report 2011-1042, Table 1.
Notes: China's Ministry of Commerce announced that the first-round quota figures of 24,904 tons represents 80% of the 2012 full year quota is calculated based on the MOC announcement.

Although the official rare earths export quota figures for 2011 were comparable to that of the 2010 level, in 2011, only half of the export quotas were filled due to poor global demand and decreasing rare earth prices at the end of

82 Ibid., 12–20.

83 Ibid., 17.

2011. Another likely factor for the diminished rare earth export figures is that many rare earth manufacturers wanted to minimize resource usage and/or push for alternative products in order to lower costs and decrease their dependence on Chinese materials. An example of this taking place occurred in August 2011 when General Electric (GE) announced the development of wind turbine generators that were intended to reduce dependence on rare earths. As for 2012, rare earth export quotas appear to be unchanged, leaving them higher than expected. Nevertheless, with only half of the quotas filled in 2011, it does not necessarily imply that Beijing is loosening its control over rare earths. If anything, this is evidence that China's government has become more stringent in its efforts to conserve resources and ultimately protect the environment.[84]

The above evidence suggests it is the Chinese central government that is exercising statecraft intervention; however, as for who is benefiting and who is losing the evidence appears to be somewhat more convoluted. Initially between 2005-2010, a rather clear pattern of winners and losers was established. Even though total quotas had decreased, the joint ventures with foreign investors (i.e., U.S. businesses) suffered more cuts than the domestic Chinese firms. Thus, during this period, Beijing's choice in policy affected its international customers more so than any of its domestic corporations. Unfortunately, the winners and losers beyond 2010 are considerably more difficult to determine. For instance, the U.S. position claims an upward trend in Chinese rare earth production quotas while its export quotas are moving downward. If this were the case, domestic enterprises would be the benefactor while foreign partners such as the United States would be the losers. China, however, disagrees and asserts that it has also implemented similar restrictive policies on its own domestic companies. Nevertheless, based on the previously stated fact that only half of the 2011 quotas were filled, it is my assessment that the Chinese central government is favoring statecraft intervention.

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[84] Ibid., 17–18.

2. Environmental Laws

Within the past few years, out of the necessity of environmental protection, China has been steadily improving its control over highly polluting and resource-based products. As related to the rare earth industry in particular, the Chinese government has attempted to implement several policies to better manage rare earth development and utilization with environmental protection. Since the 1980s, China has enacted several laws related to environmental protection, including among others the Environmental Protection Law, Law on the Prevention and Control of Water Pollution, and control of the total pollutant discharge. Other laws the state promulgated concerned the Regulations on Land Reclamation which demanded such issues as mining, environmental protection and land reclamation be conducted concurrently in an effort to restore the currently damaged environment. With the implementation of the 11th Five-Year Plan (2006-2010), Beijing has also promoted energy conservation and emission reduction as part of its overall strategy it achieve national economic and social development. In 2011, as an effort to boost environmental protection efforts in the rare earth industry, Beijing enforced the Pollutant Discharge Standards for the Rare Earth Industry. This measure was specifically intended to set limits on chemical oxygen demand (COD), as well as the emission of various pollutants such as ammonia nitrogen, phosphorus, thorium and chlorine gas.[85]

Today, China has undergone initiatives to establish an environmental risk assessment system specifically for its rare earth industry. The discussion draws on a government white paper detailing this system. Recently, their government has enforced this assessment system with little to no leniency.[86] In fact, according to current environmental laws, an analysis, prediction and assessment report of the environmental impact that may be caused by rare earth production must be submitted in advance otherwise the project will be denied. Another

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[85] Information Office of the State Council of the People's Republic of China, *Situation and Policies of China's Rare Earth Industry* (June 2012).

[86] Ibid., 8.

measure the state enforces to ensure environmental protection is attained involves observing the following stipulation in the Environmental Protection Law: All installations for the control and prevention of pollution at a particular production facility must be designed and built with the main part of the facility, and this facility should not be utilized until such installations are examined and deemed in compliance with environmental authorities in charge. China is also known to exercise a pollution discharge license system as well as implement the newly enforced Pollutant Discharge Standards for the Rare Earth Industry. By Chinese law, rare earth corporations are forbidden to discharge pollutants before they obtain pollution discharge licenses.[87]

Although not directly a policy measure, the state also delivers special environmental protection campaigns that regulate the industries of the rare earth sector. Within these campaigns, government authorities require rare earth companies to not only expedite the construction of environmental protection installations, but also comply with the pollutant discharge standards. Corporations who fail to meet these requirements are required to stop production and are instructed to close their operations should the appropriate corrective measures not be taken. According to the Chinese government, rare earth enterprises that contribute to heavy pollution, cause environmental hazards or violate the laws and regulations applicable to environmental protection will have their cases publicized, and potentially face disciplinary actions.[88]

Whether the rare earth companies operating in China are foreign joint ventures, Chinese privately owned companies, or Chinese SOEs, all three will likely be required to comply with the above disclosed policy regulations. As for whether or not we are likely to see the state engage in policies that are used for statecraft intervention, this would ultimately be dependent upon whether or not rare earth businesses comply with the state's environmental regulations. As

[87] Ibid., 1.

[88] Ibid., 2.

most of these regulations ultimately require additional funding for the rare earth firms, it is quite possible that compliance will be ignored. Thus, if we see a trend whereby rare earth companies operating in China are not meeting government environmental standards (i.e., obtain pollution discharge licenses, build environmental protection facilities, etc.), Beijing could very well engage in policies that exhibit economic statecraft.[89]

3. Export Licenses

As specified under Chinese regulation, foreign companies are strictly prohibited from mining rare earths in China. Likewise, foreign investors are also restricted from participating in rare earth smelting and separation processes, unless these firms form joint ventures with Chinese partners. Similar to their Chinese counterparts, joint ventures are however authorized to export their products under a licensing system managed by the Ministry of Commerce (MOC). Over the last few years, Beijing has slowly reduced the number of licensed firms through tightening licensing rules and environmental regulations. As early as 2006, China began limiting the number of export licenses within the country with 47 domestic and 12 joint venture rare earth licenses. In 2009, China permitted 23 domestic and 11 joint venture licenses. In 2010, the numbers were further reduced to 22 domestic and 10 joint venture participants, while finally in 2011 the numbers dropped to 22 domestic and 9 joint venture firms. As of 2012, the Chinese government has only allocated initial export quotas to 9 companies with 17 additional companies awaiting inspection results. Even if all 17 companies pass newly promulgated environmental regulations, the total licenses for 2012 will still come under 2011 figures.[90]

As noted by the analysis above, it is the Chinese central government itself that is coordinating these statecraft interventions with the international firms

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[89] I am indebted to Dr. Casey J. Lucius, Navy War College Associate Professor, for her keen insight and input on the Chinese environmental issue.

[90] Ibid., 16.

operating in China most negatively impacted. When one examines the numbers above, it is clear that although both domestic and joint venture licenses are being cut by the Chinese government, more licenses are granted to Chinese domestic companies. Thus, it is the international firms, notably U.S. businesses, who lose in the end. Although the MOC is ultimately responsible for managing these firms, it is the central government that sets policy and arguably is the entity that enforces the degree of economic statecraft.

4. Export Duties

China began to exercise export duties in 2007 in order to control the type and quantity of rare earths being shipped outside of China. In 2007, the duty rates were set at 10% and applied to less products than today. Over the years, duty rates have increased and now range anywhere between 15%-25%. An example of these elevated rates can be seen in China's 2011 export duty schedule where ferroalloys containing more than 10% of rare earth elements (REEs) were exposed to a 25% export duty.[91]

In the case of export duties, the Chinese central government is the primary entity for implementing this particular policy while the MOC is the organization delegated to manage and control the variety and quantity of rare earth products leaving China. As for identifying the specific participants who benefit and consequently lose under this prescribed policy, it is the foreign customers (i.e., United States) importing these rare earths that lose out as prices are inherently higher while the Chinese domestic entities yet again gain a noticeable competitive advantage over its international rivals.

5. Technology For Resources

Chinese industry officials are presently working on developing a new policy that is intended to lure foreign companies to establish rare earth processing facilities in China, ultimately creating more profitable downstream

[91] Ibid., 16.

processing capabilities. The plan would involve imposing more export quotas thereby forcing foreign firms to move their high-tech facilities to China. In 2002, the National Development and Reform Commission (NDRC) issued a directive detailing regulations governing foreign investments in China's rare earth sector. Specific rules included the following:

> Foreign companies are prohibited from any rare earth mining business. Foreign companies are not permitted to participate in rare earth smelting and separation projects by themselves. Exceptions will be made when they form joint ventures with Chinese partners. Foreign companies are encouraged to invest in downstream rare earth products.[92]

This new policy initiative, if implemented, will fit remarkably well with China's goal of expanding it rare earth business to the more elaborate and highly technical processing sectors.[93]

According to this information, it is the Chinese central government that has overall oversight of the technology for resources initiative, while the managers or those implementing the directives embody the NDRC. Benefactors under this policy are primarily the Chinese domestic state-owned enterprises (SOEs) as these entities will profit financially from value-added hi-tech applications produced in China; however, in the long-term I would argue that the state will also benefit as national Gross Domestic Product (GDP) rises.

6. Industry Consolidation

Over the past few years, Beijing has made it a priority to close small rare earth operations and consolidate larger ones in order to gain more control. China's policy goal as stated in "Plans for Developing the Rare Earth Industry 2009-2015" called for the establishment of three large rare earth production districts and two production systems. If implemented, this policy would separate the rare earth industry into the following three districts: North (Inner Mongolia and

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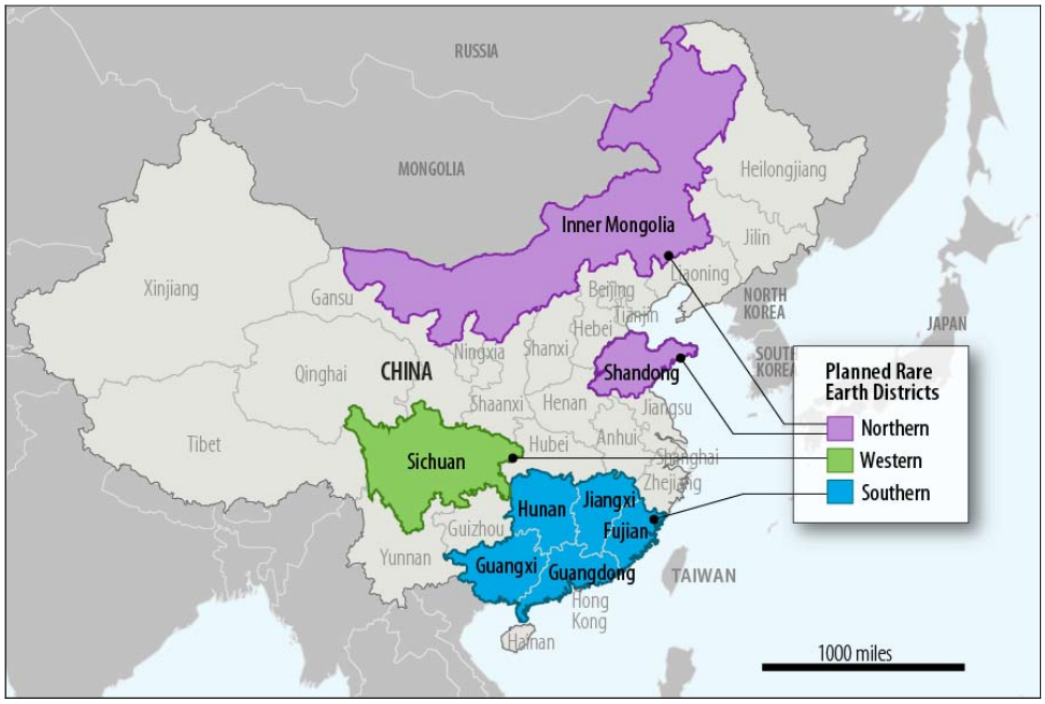
92 Morrison and Tang, "China's Rare Earth Industry and Export Regime," 18.

93 Ibid., 19.

Shandong), South (Fujian, Guangdong, Guangxi, Hunan, and Jiangxi) and West (Sichuan). (**See Figure 7.**) Likewise, the plan would establish two major rare earth systems within China: one in the north and one in the south. Light rare earths would predominantly be mined in northern China while medium-to-heavy rare earths in southern China.[94]



Source: Plans for Developing the Rare Earth Industry 2009-2015.
Note: Map prepared by Congressional Research Service (CRS).

Figure 7. Planned Rare Earth Production Districts in China

As of May 2011, Baotou Steel Rare Earth High-Tech Co. (Baotou Rare Earth) has been designated as the single government controlled monopoly to mine and process rare earths in northern China. During this same timeframe, the Inner Mongolia government also selected 31 mostly private rare earth companies to close along with four companies named to merge with Baotou Rare Earth. As for southern China, the government plans on consolidating the industry by allowing three companies to control 80% of the production within the next several

94 Ibid., 13-14.

years. All three of these companies are reportedly former government ministries with the central government still maintaining the majority of equity in the businesses. Should these four state-owned companies succeed in controlling China's rare earth industry, they may end up imposing undesirable limitations on countries like the United States. With China's emphasis placed on consolidating the industry by greatly reducing the overall number of rare earth mines and phasing out outdated and inefficient mining practices, the United States may very well be compelled to seek other options.[95]

With the proposed consolidation efforts in progress and all subsequent management and ownership converting to SOEs, it is my assessment that both the U.S. firms operating in China as well as the Chinese privately owned companies will be hit the hardest. Under this new policy plan, it is almost certain that the Chinese central government will be the benefactors in this arrangement.

7. Stockpiling

According to Xu Guangxian, China's "Father of Rare Earths," "We (China) must set up a stockpiling system for rare earths and thorium (thorium for energy) and support leading domestic producers like Baogang, Minmetals, and Jiangxi Copper to implement the stockpiling."[96] Similarly, An Sihu, assistant director of the Rare Earth High-Tech Zone Management Committee, has indicated that China will build a national rare earth resources strategic base in northern China. The basic plan is to store up all of the rare earth elements that were not used up from the annual excavation at Baosteel and use that to steady prices. As of 2008, a new rare earth industry base was being constructed in an effort to allow China to more efficiently regulate rare earth pricing and to guarantee its own future supply.[97]

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[95] Ibid., 14-15.

[96] "Chinese Rare Earth Export Calls for Immediate Stockpiling," Metal-Pages, November 2, 2009, quoted in Cindy Hurst, "China's Rare Earth Elements Industry: What Can the West Learn*?,"* Institute for the Analysis of Global Security (IAGS), March 2010, 24–25.

[97] Hurst, Institute for the Analysis of Global Security (IAGS), 25.

Although there is insufficient evidence to substantiate the overall coordinator for this new policy initiative, it is likely to be the Chinese central government. As for who benefits and loses, all other factors equal, I would submit that creating a stockpile could raise rare earth prices due to increased demand. It is my assessment that this particular policy was implemented to stabilize rare earth pricing and provide future supplies to China.

D. U.S. RESPONSES TO CHINA'S ACTIONS

China's recent actions in the rare earths market have raised several concerns about the country's motives and intentions. One theory suggests that the state simply wants to mitigate the detrimental impacts of environmental degradation and promote the sustainment of future production and development of high-tech products. Another perspective sees the country utilizing its policies as a tool of economic statecraft. From a U.S. perspective, the following two quotes effectively portray Chinese intentions behind their recent rare earth policy actions:

> I am troubled by this recent turn of events and concerned that the world's reliance on Chinese rare earth minerals, in combination with China's apparent willingness to use this reliance for leverage in wider international affairs, poses a potential threat to American economic and national security interests.[98]
>
> – U.S. Representative Ed Markey

> The mantra in the U.S. ever since the late 1990s has been that globalization will make everybody rich. By being rich, they will become democratic. By being democratic, they will all be peaceful. Well, globalization is working in a somewhat different way. China is getting rich - and India is getting rich. But China's not getting democratic. We've seen in the recent case of China embargoing the export of rare earths that it's a kind of mercantilist economy.

98 "China's Moves spook rare earth consumers," Reuters, October 22, 2010, http://www.reuters.com/article/idUSSGE69L0IB20101022.

> The economy is being run for strategic purposes in ways that we didn't anticipate.[99]
>
> – Clyde Prestowitz, former U.S. Trade Negotiator

Although China has recently enacted several rare earth policies, its increased use of export restraints was the primary factor that led the international community, but particularly the United States, to initiate trade action against China. In September 2010, the United States first officially addressed China's rare earth policies. Specifically the trade action included a Section 301 petition with the United States Trade Representative (USTR) by the United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial and Service Workers International Union (AFL-CIO CLC (USW)). The primary export restrictions identified by the union included quotas, export duties and licensing procedures. In the petition, USW made the following claim:

> China's reliance on WTO-inconsistent export restraints to dominate the world market in rare earth and other minerals not only nullifies and impairs benefits accruing to the United States under the WTO Agreement, it fundamentally distorts trade and competition in the green technology sector, among others.[100]

Shortly after the initial petition, the USTR limited its investigation to cover only Chinese subsidies that were given to domestic manufacturers using components made in China instead of purchasing imports. In December 2010, USTR submitted a WTO dispute resolution case against China. China then removed these subsidies in February 2011.[101]

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[99] Stephen J. Kobrin, "Sino-U.S. Trade Relations: They're Playing Football; We're Playing Baseball," Knowledge@Wharton, November 10, 2010, http://knowledge.wharton.upenn.edu/article.cfm?articleid=2632.

[100] USW, "Petition for Relief Under Section 301 of the 1974 Trade Act as Amended, China's Policies Affecting Trade and Investement in Green Technology," September 9, 2010, p. 23 quoted in Wayne M. Morrison and Rachel Tang, "China's Rare Earth Industry and Export Regime: Economic and Trade Implications for the United States," Congressional Research Service, April 30, 2012, 28.

[101] Morrison and Tang, "China's Rare Earth Industry and Export Regime," 28.

Subsequent to the initial petition, on March 13, 2012, President Obama announced that the United States, Japan, and the European Union (EU) would jointly file a formal case to the WTO against China imposing export quotas on its rare earths. In response to this WTO case, President Obama had the following words to say:

> Being able to manufacture advanced batteries and hybrid cars in America is too important for us to stand by and do nothing. We've got to take control of our energy future, and we can't let that energy industry take root in some other country because they were allowed to break the rules.[102]

Although not explicit, the above remarks encompass the view that China has and will continue to maintain control of its rare earth industry and engage in economic statecraft. Whether the United States likes it or not, China's rare earth policies, especially its export restrictions, have had an affect on U.S. behaviors.

But it is not just the United States government that feels as though China is engaging in economic statecraft by implementing specific policies that target the behaviors of international states. The EU stated earlier this year that China's policies in rare earths mean "foreign buyers pay perhaps twice as much for rare earth materials as domestic ones."[103] According to the EU Trade Commissioner Karel De Gucht: "China's restrictions on rare earths and other products violate international trade rules and must be removed. These measures hurt our producers and consumers in the EU and across the world, including manufacturers of pioneering hi-tech and 'green' business applications."[104]

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[102] The White House, "*Remarks by the President on Fair Trade,* Rose Garden," March 13, 2012, quoted in Wayne M. Morrison and Rachel Tang, "China's Rare Earth Industry and Export Regime: Economic and Trade Implications for the United States," Congressional Research Service, April 30, 2012, 28.

[103] David Schneider and Howard Nakamura, "U.S. challenges China on rare-earth exports," *The Washington Post,* March 14, 2012.

[104] European Commission, Press Release, *EU Challenges China's Rare Earth Export Restrictions*, March 13, 2012, quoted in Wayne M. Morrison and Rachel Tang, "China's Rare Earth Industry and Export Regime: Economic and Trade Implications for the United States," Congressional Research Service, April 30, 2012, 28.

The above WTO dispute case is strikingly similar to a WTO case brought by the United States, EU, and Mexico against China in 2009, only then, as Morrison and Tang observe, the dispute involved export restrictions on raw materials.[105] In this particular case, the restrictions in question included export quotas, export duties, export licensing, export price requirements, and export quota administration requirements on specific raw materials. Under this case the United States petitioned that Chinese policies intentionally lowered prices for Chinese firms in an effort to give them an unfair competitive advantage. USTR claimed that such export restrictions could

> artificially increase world prices for these raw material inputs while artificially lowering prices for Chinese producers. This enables China's domestic downstream producers to produce lower-priced products from the raw materials and thereby creates significant advantages for China's producers when competing against U.S. and other producers both in China's market and other countries' markets. The export restraints can also create substantial pressure on foreign downstream producers to move their operations and, as a result, their technologies to China.[106]

As Morrison and Tang note, the results for China were nothing short of disastrous. In July 2011, a WTO panel ruled that China's restriction on exports and duties on several raw materials violated its previously agreed upon WTO commitments. The panel stated that China's Protocol of Accession formerly submitted to the WTO did not allow China to use certain provisions in WTO agreement to warrant its inconsistent trade restrictions. Furthermore, China failed to show how export restrictions were justified by reasons of non-replaceable natural resources. For instance, on the issue of non-replaceable materials, China could not demonstrate how it imposed similar restrictions on the production of domestic materials. Although China appealed the WTO panel's ruling, on

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105 Morrison and Tang, "China's Rare Earth Industry and Export Regime," 29.

106 USTR, Press Release, July 11, 2011, quoted in Wayne M. Morrison and Rachel Tang, "China's Rare Earth Industry and Export Regime: Economic and Trade Implications for the United States," Congressional Research Service, April 30, 2012, 29.

January 30, 2012, a WTO Appellate Body did in fact affirm that China's trade restrictions were in violation of WTO commitments.[107]

In many ways the above case over Chinese raw materials was remarkably similar to the formal case that was filed with the WTO on March 13, 2012. First, both cases brought before the WTO were jointly filed with members from the international community. However, unlike in the earlier case where Mexico joined the United States and the EU, the most recent case involving rare earths had Japan as a vested representative. Second, both disputes involved near identical trade policies by China. For instance, although one case covered Chinese raw materials while the other dealt exclusively with rare earths, both argued Beijing was unfairly imposing export quotas, export duties and export licensing against its trading partners. Lastly, both cases claimed Chinese policies intentionally lowered prices for Chinese firms in an effort to give them an unfair competitive advantage. Incentives such as Chinese subsidies were given to domestic manufacturers in both cases ultimately enabling China's downstream producers to produce products at lower costs.[108]

A specific case that arguably correlates with China's intent to manage its rare earth policies as a tool for economic statecraft was observed in fall 2010. On September 8, 2010, a collision occurred between a Chinese fishing boat and two Japanese Coast Guard vessels within contested waters resulting in the arrest of a Chinese captain by Japanese authorities. As a result of this diplomatic dispute, China temporarily ceased high-level exchanges and begun halting rare earth exports to Japan. Although Japan agreed to release the Chinese captain, on October 19, 2010, the New York Times stated that China's embargo of rare earths to Japan seemed to be still in effect and was possibly extended to the United States and the EU. Shortly thereafter, on November 19, 2010, the New York Times reported China's resumption of rare earths to Japan but with some

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[107] Morrison and Tang, "China's Rare Earth Industry and Export Regime," 30.

[108] Ibid., 27-28.

delay. It is interesting to note that Chinese trade data depicts rare earth exports to Japan in October and November 2010 significantly lower from previous months, but rose substantially in December 2010.[109] While by no measure does this incident prove Beijing utilizes its rare earth policies as a tool of economic statecraft, but it does provide some insight as to China's anticipated behavior when conflicts arise.

Although there are counter views surrounding the issue of China's alleged efforts to use its control of rare earths as a tool of economic statecraft, the following quote clearly gives support to this notion:

> A Chinese government that is dangerously trigger-happy, willing to wage economic warfare on the slightest provocation....Couple the rare earth story with China's behavior on other fronts - the state subsidies that help firms gain key contracts, the pressure on foreign companies to move production to China and, above all, that exchange-rate policy - and what you have is a portrait of a rogue economic superpower, unwilling to play by the rules.[110]

A second case that points to China's rare earth policies eliciting economic statecraft took place between China and Japan in fall 2011. In this case, China's policies on rare earth exports reflected an attempt by Beijing to force foreign companies reliant on rare earths to move their production centers and technology to China in exchange for a low-cost supply of rare earths. In this example, Japanese business representatives were reportedly told by Chinese government officials to move their plants to China in exchange for a steady supply of rare earths. According to a Japanese publication, the Daily Yomiuri, a high-level delegation of Japanese officials visiting China in September 2011 was apparently told by the Chinese Vice Premier, Li Keqiang, that China wanted technological support from Japan in the rare earth industry.[111] The following media reports

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[109] Ibid., 31.

[110] The New York Times, "*Rare and Foolish,*" October 17, 2010, quoted in Wayne M. Morrison and Rachel Tang, "*China's Rare Earth Industry and Export Regime: Economic and Trade Implications for the United States,"* Congressional Research Service, April 30, 2012, 32.

[111] Morrison and Tang, "*China's Rare Earth Industry and Export Regime,"* 18–19.

arguably present some evidence that Tokyo responded to alleged economic statecraft:

> Hitachi Metals, a major producer of high-powered magnets, reportedly indicated in August 2011 that it was contemplating moving production of some of its neodymium-based magnets to China.[112] In September 2011, Toyota announced that it was planning to manufacture components (such as electric motors and batteries) for its hybrid cars in China, a move that some analysts speculated was motivated, in part, by Toyota's desire to gain access to rare earths.[113]

This technology initiatives policy or technology for resources strategy, referenced earlier in this chapter, fits very closely with Beijing's goal of growing its rare earth industry to the more complex processing sectors. In fact, many of these policy measures seem to be part of a larger set of industrial policies China has initiated in an effort to become the world's leader in technology and innovation.[114] Even the local governments offer incentives to influence foreign companies such as the United States to move production facilities to China because they believe outside engagement would bring technology to resource rich regions.

As evident by China's rare earth policies, it is my assessment that its motives are predominantly mercantilist. To be sure, China does exhibit some degree of economic interdependence with the United States as both countries rely on one another in exchange of rare earths; however, when you analyze China's true intentions, I believe the state is acting in its own interests. As noted by the above policy and evidenced in China's National Medium-and Long-Term

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[112] Yuko Inoue, and Julie Gordon, "Analysis: Japanese Rare Earth Consumers Set Up Shop in China," *Reuters*, August 12, 2011, quoted in Wayne M. Morrison and Rachel Tang, "China's Rare Earth Industry and Export Regime: Economic and Trade Implications for the United States," Congressional Research Service, April 30, 2012, 19.

[113] BBC, "Toyota to Make Hybrid Car Parts in China to Boost Sales," September 5, 2011, quoted in Wayne M. Morrison and Rachel Tang, "China's Rare Earth Industry and Export Regime: Economic and Trade Implications for the United States," Congressional Research Service, April 30, 2012, 19.

[114] Morrison and Tang, "China's Rare Earth Industry and Export Regime," 19.

Program for Science and Technology Development (2006-2020), which was released by China's State Council in 2006, the country is principally interested in one objective - Modernizing the structure of its economy by transforming the country from a world center of low-tech manufacturing to one that is a dominant center of innovation by 2020 and a world innovation leader by 2050. China sees developing technologies for manufacturing rare earths as being a key priority for the country's economic success.[115]

In the end, China's strategy to push for technological development through restrictive export policies has brought tremendous concern to many foreign companies, particularly those in the United States. To U.S. firms, it seems Beijing is intentionally using its rare earth policies to lure foreign investment that would likely bring high-tech applications to Chinese companies needed to advance its down-stream rare earth sector.

A final U.S. case on China's utilization of rare earth policies involves observations noted by Keith Bradsher in The New York Times. He suggested that China's rare earth policy detailing its consolidation efforts amounts to multiple state-owned mining companies who are in-turn buying up several smaller domestic mining firms. These actions or policy measures could enable what Bradsher refers to as a "state-owned rare earth oligopoly."[116] In other words, by creating such architecture, China would be able to limit rare earth exports without implementing government policies that direct the restrictions. As WTO rules generally cover government policies versus oligopolies, it will inevitably be much more difficult for the United States to win the latest rare earth case against China's recent export restrictions on rare earths.[117]

China's rare earth policy emphasizing consolidation not only affects the geo-political international system but a newly formed oligopoly would also enable

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[115] Ibid., 19.

[116] Keith Bradsher, "Specialists in Rare Earths Say a Trade Case Against China May Be Too Late," *The New York Times,* March 14, 2012.

[117] Ibid., 2.

the newly selected Chinese SOEs to influence rare earth prices and affect the position of its competitors including the small domestic mining firms. Under this new consolidation effort, the Chinese central government will likely benefit the most from these new policy measures, as it maintains the majority of equity in these businesses. Conversely, international overseas firms and domestic companies will ultimately suffer. It is my assessment that although Beijing clearly desires to modernize its economy through rare earth trade, it will not be at the expense of losing any control within its own central government.

E. CHINA'S VIEW ON RARE EARTHS: DOMESTIC ISSUES CALL FOR NEW POLICIES

In an effort to fully conceptualize why China attempts to use its rare earth policies as a tool of economic statecraft, it is crucial to first analyze the following problems within the industry: environmental degradation, domestic consumption, smuggling and illegal mining activities, and excessive exploitation. Despite all of these problems being important, each issue addressed below is listed in order of precedence (i.e., most important / significant first) to justify China's recent behavior. Specifically, by examining each of these problems it not only enables us to better understand China's recent rare earth policy actions, but it also gives the international community including the United States a broader understanding of China's long-term strategic intentions. Take for instance China's most detrimental rare earth problem, environmental degradation. China knows full well that in order to compensate for the exorbitant environmental costs (i.e., pollution, health and safety, etc.) incurred through rare earth production, it must exercise certain measures that force the United States to lessen these expenses. Presently China bears the environmental costs for its international consumers; however, by engaging in economic statecraft, countries like the United States are compelled to either buy rare earths at considerably higher prices or are pushed to forego on this critical resource and thus help preserve China's ecological environment and sustain any future production.

So why should the United States care about China's problems? If Washington actively seeks to identify, familiarize itself, and take sufficient steps to mitigate these obstacles, then Beijing would be less inclined to engage in economic statecraft by manipulating rare earth prices and more predisposed to allowing market forces control the industry. An example of active engagement might entail U.S. firms operating in China who willingly comply with Chinese government regulations in areas of safety and environmental measures. Conversely, if the United States failed to obey China's domestic rare earth industry regulations, China would be more motivated to pursue policies that force international firms to offset the cost associated with sustaining rare earth production.

The following material best illustrates the critical problems China currently faces within its own rare earth industry:

1. Extreme Damage to the Ecological Environment

Although each of the problems to be addressed are all serious matters the Chinese government must confront, I would submit that preventing extreme damage to the environment is by far the most pressing issue Beijing must overcome. A large concern behind China's practice of mining rare earths is the negative impact it has on the environment due to poor mining practices. If not done correctly, there are a number of potential environmental implications to mining rare earths. Unfortunately due to large revenue potential, many Chinese rare earth mines have been operating illegally, with little regulation, causing excessive environmental problems.[118] Chinese authorities would argue that outdated production processes and techniques in mining, dressing, smelting, and separating rare earth ores have greatly damaged vegetation, caused pollution, soil erosion, and reduced or possibly destroyed crop supplies. Mines with light rare earths frequently contain many associated metals, large quantities of hazardous gases, and wastewater with high concentrations of ammonium

[118] Hurst, *Institute for the Analysis of Global Security (IAGS),* 16.

nitrogen, and radioactive residues. Additionally, in some areas, excessive rare earth mining has contributed to landslides, contaminated waters, and even caused serious accidents affecting people's safety, health, and the ecological environment.[119]

The following quote by the Chinese Society of Rare Earths sufficiently illustrates the magnitude of waste generated from rare earths production:

> Every ton of rare earth produced, generates approximately 8.5 kilograms (18.7 lbs) of fluorine and 13 kilograms (28.7 lbs) of dust; and using concentrated sulfuric acid high temperature calcination techniques to produce approximately one ton of calcined rare earth ore generates 9,600 to 12,000 cubic meters (339,021 to 423,776 cubic feet) of waste gas containing dust concentrate, hydrofluoric acid, sulfur dioxide, and sulfuric acid, approximately 75 cubic meters (2,649 cubic feet) of acidic wastewater, and about one ton of radioactive waste residue (containing water).[120]

Additionally, according to figures conducted within Baotou, China's primary rare earth production location, all of the rare earth facilities in the region produce approximately 10 million tons of wastewater every year. Likewise, most of this wastewater generated is discharged into the environment without being effectively treated. This process not only contaminates potable water for daily living, but it also contaminates the surrounding water resources including irrigated farms.[121]

Another factor that inevitably leads to poor mining practices and ultimately a damaged environment is the high cost associated with rare earth production. According to a representative of one Chinese factory in Baotou, Inner Mongolia, while companies will allocate some funds toward more environmentally friendly mining processes, others choose to keep those expenses at a minimum in order to maintain their competitive edge in the economic environment. Unfortunately,

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[119] Information Office of the State Council of the People's Republic of China, *Situation and Policies of China's Rare Earth Industry (*July 2012).

[120] Hurst, *Institute for the Analysis of Global Security (IAGS)*,16.

[121] Ibid., 16.

the costs connected with environmental improvements are absorbed by the buyers. It is also worth noting that the land belongs to the government and not the individual mining factories. Thus, if a rare earth producer pays a significant sum of money for equipment or processes that are more environmentally friendly, that investment could be eliminated should the government decide to take back the land for any number of reasons. This consequently reduces the incentive to establish any type of environmental standards.[122]

Even though China may have general pollution control standards, it has never truly implemented pollutant discharge standards for the rare earth industry. With the Chinese rare earth sector growing so rapidly, there has been no effective method to control the typical pollutants such as ammonium nitrogen and thorium dust, which emanate during the production state. Moreover, health and safety regulations are frequently overlooked for several reasons, including:

- Large and complex industry that is often difficult to supervise;
- Companies and leadership are generally not held accountable. For instance, in the United States, if an employee of a mining facility dies or suffers from environmental hazards, implications could entail a lawsuit or pension that the firm is obligated to render. In China, these regulations are often disregarded.[123]

Arguably this problem is the most crucial to the longevity of China's future sustainment of rare earths as its potential consequences are inevitably the most severe. For instance, if China were to continue to proceed down a path of outdated production processes and unregulated pollution control standards, environmental conditions could dramatically degrade leading to possible civil unrest throughout both rural and urban China. To be sure, the Chinese government can take domestic measures to protect the environment (i.e., Ministry of Land and Resources ended new licenses for rare earth production; establishing a national stockpile; Chinese state-owned companies invest

[122] Ibid., 17.

[123] Ibid., 18.

overseas; etc.),[124] but it is more cost effective and efficient for Beijing to employ economic statecraft against its international trading partners. Instead of the Chinese central government spending vast resources and time in an attempt to regulate the rare earth industry, new policies can be implemented that impede international consumers from buying excessive quantities of rare earths (i.e., continue imposing rare earth export quotas). In the end, international companies like the United States would either be required to pay higher prices for rare earth imports or seek other alternatives. Either way, China could arguably offset huge environmental costs purely by pursuing economic statecraft.

2. Domestic Consumption

With nearly a quarter of the world's population and arguably the most rapidly growing economy on earth, China is up against the challenge of ensuring it has sufficient rare earths to sustain economic development, while also faced with the task of appeasing the United States, which has been contesting China's policy measures pertaining to rare earths. According to Wang Caifeng, China's Deputy Director-General of the Materials Department of the Ministry of Industry and Information Technology, in 2008 China consumed 70,000 metric tons of rare earths with global demand estimated at 130,000 metric tons. China exported 10,000 metric tons of rare earth magnets and over 34,000 metric tons of other rare earth products.[125]

China's consumption of rare earths is also expected to increase substantially as more and more U.S. firms relocate their production facilities to China to take advantage of lower rare earth prices and a reduction to their overall production costs. Some observers would argue that this strategy by China is designed to maintain a tight control on the overall industry.[126]

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[124] The National Bureau of Asian Research, *Asia's Rising Energy and Resource Nationalism* (Seattle, September 2011).

[125] Hurst, "China's Rare Earth Elements Industry: What Can the West Learn?," 19.

[126] Ibid., 20.

3. Smuggling

Due to numerous circumstances, including domestic and international demand, the smuggling of rare earths to overseas markets continues to be an issue despite the efforts China's customs have taken.[127] According to China Business News, approximately 20,000 metric tons of rare earths were smuggled from China in 2008, which was assessed to have accounted for one third of the total volume of rare earths leaving China in that particular year. This illegal activity is often the primary reason behind the inaccuracies between the actual data and the official statistics of rare earth production and Chinese exports.[128] Smuggling inevitably keeps rare earth prices low and continues to reduce strategic resources. As a result, Beijing has implemented a nationwide enforcement on illegal mining activity since the second half of 2010.[129] Beijing's policies to tighten illegal mining activity ultimately enable fewer rare earths to be produced and subsequently exit the country. In the end, this policy action raises rare earth prices for international consumers, and forces states such as the United States to adopt new economic policies and giving China a competitive advantage.

4. Excessive Exploitation of Rare Earth Reserves

With over 50 years of extreme mining, China's rare earth reserves have been decreasing and the number of years of assured rare earth supply is getting smaller. The decline of rare earth resources throughout the dominant mining areas is accelerating, as most of the original resources are exhausted. In Baotou for instance, only one-third of the original volume of rare earths are available in the main mining locations. Unfortunately with so many mines spread throughout a large area, it becomes very difficult and costly to monitor their operation. As a

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[127] Information Office of the State Council of the People's Republic of China, *Situation and Policies of China's Rare Earth Industry* (July 2012).

[128] Morrison and Tang, "China's Rare Earth Industry and Export Regime," 11.

[129] U.S.-China Economic and Security Review Commission, *China's Rare Earths Industry and its Role in the International Market (*November 3, 2010).

result, illegal mining has greatly reduced local resources, and mines that are abundant in reserves and easy to exploit are preferred over the others. This excessive exploitation ultimately results in a low recovery rate of the rare earth resources.[130] Thus, to prevent over exploitation and maintain high rare earth recovery rates, China is encouraged to employ new policy actions intended to influence international actors or foreign firms operating in China over its domestic enterprises. This strategy would ultimately allow China to better meet its long-term strategic economic interests as it could avoid allocating unnecessary expenses to its domestic industries.

As mentioned earlier in this section, Beijing's official position pertaining to its recently promulgated rare earth policies is to address environmental concerns in China and to better manage and conserve non-replaceable natural resources. With the many detrimental effects rare earth production causes and its ultimately limited supplies available, Beijing asserts that its perceived mercantilist policies are not intended to economically harm other countries but rather to ensure the safety of its own country and the assured sustainment of rare earth production for both Chinese citizens and the entire world.

The following quote taken from Chinese Premier Wen Jiabao's speech on October 7, 2010 best summarizes Beijing's position on this issue:

> We haven't imposed, and will not, impose an embargo on the industry. We are pursuing a sustainable development of the rare earth industry, not only to meet the demand of our own country, but also to cater to the needs of the whole world. We not only need to accommodate the current demand, but also, more significantly, need to take a long-term perspective. It is necessary to exercise management and control over the rare earth industry, but there won't be any embargo. China is not using rare earth as a bargaining chip. We aim for the world's sustainable development.[131]

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130 Information Office of the State Council of the People's Republic of China, *Situation and Policies of China's Rare Earth Industry* (July 2012).

131 Morrison and Tang, "China's Rare Earth Industry and Export Regime*,"* 32.

With the WTO's recent filing in March 2012 and the likelihood that the case will be referred to a WTO panel for ruling, Chinese rebuttals will most likely center on the environmental degradation argument as the WTO authorizes export restrictions on environmental grounds. Assuming present consultations fail between the United States and China, Beijing will also likely demonstrate that its policies emphasize measures relating to the sustainment of non-replaceable natural resources. Should the current consultations escalate to a WTO ruling, the United States will likely counter-argue by highlighting the upward trend of a Chinese rare earth production quota while the export quota is on a downward trend. In other words, the United States would submit that China is unfairly favoring its domestic enterprises over it foreign partners.[132] China however, would submit that this contention is simply not the case. According to Inside US-China Trade newsletter, China has recently implemented new policies involving domestic restrictions on rare earth mining. China asserted that these actions were taken for environmental purposes. The newsletter stated that the Chinese government made these recent restrictive measures not only to its rare earth exports, but also to limit new licenses required for rare earth mining by Chinese firms. The Chinese government also publically announced that new production limits would take effect regardless of the rare earth end use. Ultimately it did not matter whether the rare earths were being used for international or domestic purposes; all Chinese firms would receive these new production restrictions. Industry sources acknowledged that China had completely restructured its rare earth mining industry with the aim of mitigating environmental impact. As recently as last year, Beijing managed to close mining operations in order to come up with new licensing procedures and it consolidated the overall industry into a few conglomerates to better regulate the environmental impact.[133]

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[132] Jane Nakano, "Rising Tensions Over China's Monopoly on Rare Earths?" *Asia Pacific Bulletin no. 163* (May, 2012).

[133] "New Chinese Measures Could Make Parts of Rare Earth Challenge Tougher," *Inside US-China Trade 12*, no. 14 (April 2012).

The Chinese government fully believes that it has done nothing wrong with regard to its rare earth policies. As noted by spokesman Liu Weimin, during a recent Foreign Ministry briefing, Chinese regulations are in full compliance with WTO rules. Despite enormous environmental pressure, Beijing has made it clear that it will continue to maintain rare earth exports throughout the international system.[134] Likewise, even some WTO officials were opposed to U.S. complaints against China's rare earth policies as WTO rules do not prohibit export duties and authorize trade restrictions for environmental protection purposes. Furthermore, Article XX of the General Agreement on Tariffs and Trade (GATT) permits exceptions that are related to non-replaceable natural resources as well as limitations on supply.[135] In China's defense, most countries have export controls. According to a National Bureau of Asian Research special report published in 2011, Japan restricts the export of 208 various commodities, while U.S. export restrictions mainly center on arms and high-tech products. To that end, commodity exports under U.S. trade restrictions also requires a license issued by the International Trade Administration of the Department of Commerce. Many countries also place high duties on commodities. For instance, in Australia, export taxes on several natural resources are extremely high.[136]

According to the Chinese government, in a recently published white paper, opening up is without question a fundamental national policy of China. In fact, Beijing clearly espouses concurrent consideration to both domestic and international resources, and publicly promotes a fair strategy that both ensures a rational supply of rare earths to the United States while also protecting the environment and resources. Beijing's position is such that China will continue

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[134] Schneider and Nakamura, "U.S. Challenges China on rare-earth exports," 1–2.

[135] Morrison and Tang, "China's Rare Earth Industry and Export Regime," 30.

[136] The National Bureau of Asian Research, *Asia's Rising Energy and Resource Nationalism* (September 2011).

with its initiatives in promoting equitable trade along with international exchanges and cooperation.[137]

As indicated by the Chinese government, China will continue to provide rare earths to the international market. From Beijing's perspective, the restrictive measures over rare earth exports put in place by the Chinese government are implemented in tandem with that of its mining efforts, production, and other aspects of the rare earth industry. According to China, these policy goals not only align with China's sustainable production initiatives but are also in the interests of other countries in the world. As evident by their remarks, China wants to strengthen cooperation endeavors with other rare earth consumers and producers as well as bring solutions toward solving the ongoing environmental problems within the industry. China also desires for surrounding countries, including the United States, to make an effort to develop their own resources so the supply of rare earths can be expanded throughout the international environment. China claims to also be actively engaged in creating an open market for foreign investment, pushing for foreign participation in several areas including equipment manufacturing as well as the production of high-end application development.[138]

In the realm of international cooperation, China has actively participated in many international exchanges pertaining to the rare earth industry. For example, it has repeatedly established the International Rare Earth Industry Summit, International Conference on Rare Earth Development and Application, and a few other forums for academic exchanges. China has also participated in programs held by the International Workshop on Rare Earth Permanent Magnets, the International Commission on Illumination and other similar international groups. Additionally, it has conducted both bilateral and multilateral exchanges and communication forums concerning rare earths with the United States, the EU,

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[137] Information Office of the State Council of the People's Republic of China, *Situation and Policies of China's Rare Earth Industry* (July 2012).

[138] Ibid., 12–13.

Russian and Japan. In the eyes of China, the healthy development of the rare earth industry is absolutely critical to the sustainable use of rare earth reserves as vital natural resources of the world. With the understanding that all countries depend on one another for their own existence and wealth, Beijing professes that all states should not only enhance cooperation, but also to share responsibilities and accomplishments. Moreover, China promises to improve upon its rare earth policies, work tightly with international players to ensure a rational order of the rare earth market, and positively influence the word's economic development through new technical innovations.[139]

F. CONCLUSION

This chapter began by introducing a key table highlighting seven major Chinese rare earth policy initiatives. By linking each of China's rare earth policy actions with its respective policy authority, stated long-term goal and statecraft lever, China's strategic intentions can be better measured. Moreover, by reviewing the evidence revealed by the three illustrative stories previously addressed in this chapter, I was able to assess that out of all seven policy initiatives, imposing export quotas had the greatest influence on the economic behavior of its domestic and international actors. Lastly, I assess that policies assigned higher statecraft lever points (i.e., export quotas) are more likely to be used by Beijing to attain their overall long-term strategic goals.

Despite China becoming the largest rare earth reserve, consumer, producer and exporter, it has undoubtedly faced major problems including: environmental degradation, domestic consumption, smuggling activities, and overexploitation. Nonetheless, in order to adequately protect the rare earth industry, China has taken upon itself the decision to implement a series of policies designed not only to regulate rare earth production, but also to control the level of exports. Although all of the above disclosed policies provide insight

[139] Ibid., 13.

into China's behavior, I would argue that it is Beijing's imposition of export quotas that have exposed China's true intentions.

In sum, this study did reveal modest signs indicating Beijing's necessity to rely on economic interdependence through its participation in various rare earth forums and exchanges. Likewise, its national position to promote equitable trade of rare earths via the international market does suggest a moderate level of cooperation. However, based upon the data provided in the above stories, it is my contention that Beijing's rare earth policies point more toward economic statecraft. Although Beijing would never openly admit such a practice, its efforts to control the market via these policies in order to enhance its own economic development and growth demonstrate economic statecraft. (as illustrated by table 3 at the beginning of this chapter) With Beijing's virtual monopoly in rare earths, it fully knows that by imposing export quotas, other countries such as the United States will be compelled to move their hi-tech manufacturing facilities to China in order to access critical rare earths at low cost. The United States may receive access to the rare earth market, but it is China that ultimately comes out on top as its industry will capitalize on new technologies and innovations that modernize the structure of its economy.

In the end, China's ability to utilize its rare earth policies as a tool of economic statecraft will give the country an edge within the industry at least in the near-term.

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V. CONCLUSION: KEY FINDINGS, CHINA'S RISE, & U.S. STRATEGIC IMPLICATIONS

A. INTRODUCTION

After successfully developing a comparative framework of China's rare earth element (REE) policies by using two prominent international relations theories (structural realism and neoliberal institutionalism) and applying its economic behavior to these theories, I was able to conclude, on balance, that China is indeed employing an economic statecraft approach to the sector. Furthermore, by building a detailed analytical narrative of China's rare earth element policies through qualitative comparative analysis, I was able to identify several key strategic consequences of China's behavior in REEs. Thus, the aim of answering to what extent China is using its rare earth element policies as a tool of economic statecraft was fulfilled.

The purpose of this conclusion is threefold: (1) address critical key findings; (2) offer some insight as to what type of rising power China will be; and (3) detail various strategic implications for the United States.

B. KEY FINDINGS

First, although Beijing has and will continue to utilize its rare earth policies as a tool of economic statecraft, it will do so rather cautiously. To be sure, China's capabilities in economic power are continually expanding along with its effectiveness in choosing from a large selection of economic statecraft policy options; however, its present reliance on broad economic interdependence with the United States often checks its leverage in exercising economic power. Put differently, despite China's recently growing economic power and influence, it is economically interdependent on international actors such as the United States. Whether China has or will ever openly admit it, Beijing's continued economic growth and development is heavily dependent on free market economic trade

with its international actors. Nevertheless, China has not recently engaged in any sort of free trade or fair access within its rare earth's industry. In fact, the only evidence to date that suggests any degree of interdependence involves the Chinese government's willingness to cooperate with the United States by offering its assistance in recycling rare earths and developing valuable substitutes. Beyond this one area, China has done nothing to prove it is a cooperative partner within the rare earth industry. China is simply not employing sufficient economic coordination or cooperation within the REE sector to justify an interdependent approach.

Consequently, if we re-examine the evidence presented in chapter 4, specifically Table 3, one can see that all seven of China's rare earth policy actions elicit some degree of economic statecraft. Take for example, the Chinese government's 2008 implementation to initiate new regulations ensuring greater control over the rare earth industry. With China's Ministry of Land and Resources (MLR) issuing the *Guidelines for Development of National Mineral Resources 2008-2015,* China's rare earth industry was deliberately being protected and its exploitation and production restricted. This government controlled directive enabled Beijing to not only protect its rare earth industry, but also to influence the behaviors of both domestic and international (principally U.S.) actors. Similarly, Beijing's efforts to impose rare earth export quota, licenses and / or duties on international and domestic firms also demonstrated the use of policy as effective tools of economic statecraft. Imposing export quotas on these entities proved to be the most effective statecraft lever as this tool arguably had the largest influence on economic behavior of all the stated policy actions. Whether it was a Chinese domestic firm or a U.S. rare earth corporation purchasing these restricted resources, Beijing succeeded in attaining substantial economic profits and ultimately was able to promote its national objective.

Second, Beijing has been successful in utilizing its rare earth policies as a tool of economic statecraft by both influencing the behavior of international actors and through deliberate interaction with its domestic rare earth organizations. The

first illustrative story captured in this study involving a Chinese embargo on rare earth shipments to Japan clearly illustrates China's ability to exercise its soft power capabilities in order to achieve Chinese strategic interests. By employing this particular rare earth policy, Beijing successfully managed to influence the economic behavior of a targeted international actor. China's policy actions in this instance not only compelled an international actor to relinquish the captured Chinese fishermen, but it also affected Japan's economic behavior as this needed resource was made temporarily unavailable. Similarly, story two also involved international actors; however, in this instance, Beijing used the technology for resource policy as a tool of economic statecraft. In other words, the Chinese government successfully influenced the economic behavior of Japanese business representatives by forcing Japanese firms reliant on rare earths to move their production centers and technology to China. This form of economic statecraft not only enabled China to establish a relative economic gain over Japan but it also empowered China to strengthen its long-term economic power. By exercising its rare earth policies, China is able to attain foreign technology, and build-out and serve its domestic rare earth manufacturing industry. In the end, China's goal of exporting value added materials can be achieved which ultimately leads to China's national objective of modernizing the structure and magnitude of its economy. Alternatively, story three exposes China's ability to manipulate the economic activities of its domestic industrial rare earth partners. Specifically, the Chinese government leveraged its economic power by imposing the Industry Consolidation policy against both private rare earth firms and state-owned enterprises (SOEs). By implementing a consolidation policy, Chinese SOEs will maintain the majority of capabilities to economically influence rare earth prices of all remaining domestic mining firms. Although the consolidation initiative has not completely taken effect, it is my assessment that these policies will affect U.S. firms operating in China and Chinese privately owned companies the most. In the end, these policies will allow the Chinese central government to regulate REE trade and ultimately set prices.

Third, although Beijing expresses the desire to deepen its integration with the global economy through the continual use of rare earth policies, it will not be at the expense of losing any control within the Chinese Communist Party (CCP). The CCP knows full well that it cannot exert too much pressure on its domestic rare earth industry corporations (i.e., exercising overly harsh rare earth policies) without experiencing some type of social unrest. For instance, should the CCP impose excessive rare earth quotas on its domestic firms, internal opposition would likely occur potentially forcing leadership members to resign. However, with the upcoming rare earth consolidation initiative underway and the majority of the industry being subordinated to SOEs, the Chinese central government will be better able to maintain its legitimacy, influence economic behavior, and ultimately modernize the structure of its economy through aggressive rare earth policy actions. In the end, China's political elites encourage state economic success, but not without maintaining their own autocracy and legitimacy within the government.

Finally, despite the many conditions for determining China's effectiveness in economic statecraft, I submit, following Norris, that it is the ability of the Chinese government to structure its rare earth element sector and direct its domestic enterprises that matter the most. China has clearly wielded its economic policies on the United States in order to attain national interests, but the true measure of weighing China's effectiveness in economic statecraft lies in its ability to control domestic economic interaction.[140] Evidence of this strategy involved China offering various incentives to its domestic partners in order to achieve its national strategic objectives. In the context of this study, specific incentives entailed the state waiving licensing fees or duties to domestic rare earth firms while forcing these expenses on U.S. firms. Another example correlates to each of the two previously mentioned World Trade Organization (WTO) cases. In both cases, Chinese rare earth policies intentionally lowered prices for Chinese firms in an effort to give them an unfair competitive advantage.

[140] Norris, "Economic Statecraft with Chinese Characteristics," 67.

In either instance, China was able to affect the economic behavior of the United States through the direct control of its domestic actors.

C. CHINA'S RISE: NATIONAL STRATEGIC OBJECTIVES

As evident by its recent belligerent behavior over the past few years, China has arguably become difficult for the world to handle. For example, Beijing has recently exhibited increasingly aggressive behavior toward its neighbors in Asia given the vast natural resources available in the South China Sea. Moreover, its relations in Africa and Latin America have also become somewhat strained as it seeks additional resources to sustain its growing energy demand. With Beijing's gradual expansion and continual economic rise in the global economy, many observers are wondering how long its new boldness will last. Is this observed behavior temporary or are we inclined to see China exhibit this abrasive identity indefinitely?[141]

Although China's foreign policies often exhibit a multitude of competing identities, I believe its core international identity is primarily understood through a realist school of thought. Like Chinese Realists, I believe China honors the nation-state while also emphasizing the principle of state sovereignty. Similarly, I envision China mostly dismissing the international environment while concurrently placing a great deal of emphasis on building up its own state. In the future, I perceive China as a state that will find its own way in the world while also resisting outside pressures. Taking an offensive realist perspective, I argue that China has and will continue to use its recently attained economic influence to compel international actors such as the United States to react in a manner that meets Beijing's long-term strategic objectives.[142]

In the context of this study, China will leverage its near-monopoly on the rare earths industry by continuing to aggressively employ policies that meet its

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141 David Shambaugh, "Coping with a Conflicted China," *Washington Quarterly 34,* no. 1 *(2011).*

142 Ibid., 12.

strategic intention. With China's recent employment of its rare earth policies, particularly technology for resources, China will ultimately produce value-added products and become a major exporter of advanced technology. In 10 to 20 years, it is likely China will impose even more restrictive policies that undermine the United States and benefit China. In my mind, the term "peaceful rise" is a threatening theory because it conveys to potential adversaries a message that China will not act aggressively to defend its national sovereignty or strategic interests. I believe China is dissatisfied with the state of U.S.-China relations and believes that its future relationship is not in good standing. If China does not oppose the United States through its foreign policy tools, the United States will simply subvert China's strategic interests.[143] However, with the advent of such bold policies, China can sustain high prices on rare earths, attain needed high-technology, and mitigate many of the negative effects on environmental degradation.

As evident by China's recent rare earth policy actions, the state has become an increasingly realist, self-interested nation that seeks to promote its own nationalistic sentiments and economic development. Despite the many reasons that have driven this tendency, I believe China's environmental challenges, technological needs and desire to maximize its economic development contribute the most. In the end, Beijing's recent behavior in its rare earth policy actions suggest China will likely seek greater economic power, more assertive global power, and ultimately become a less cooperative international partner.[144] Beijing will involve itself in international affairs, but only when it benefits China.

D. IMPLICATIONS FOR U.S. POLICY TOWARD CHINA

Given the above international identity of China, one might suggest that the United States should respond with a realist approach. For instance, in the context

143 Ibid., 13.

144 Ibid., 24.

of this study, the United States would find it favorable to impose aggressive trade policies against China. But in reality this method would likely be counter-productive. Should the United States counter with a realist response, it would only prolong the existing security dilemma in U.S.-China relations or worse produce an adversarial relationship that neither state desires. In fact, aggressive U.S. policy actions would only fuel Chinese nationalism, and make it even more challenging to collaborate with China globally. Stringent U.S. economic policies may seem sensible as these measures attempt to reduce trade barriers; however, overly aggressive U.S. actions could easily cause China to counter U.S. actions and ultimately create a trade war.[145] Take for example the previously referenced March 13, 2012 jointly filed case between the United States, Japan and the European Union (EU) to the WTO against China for imposing export quotas on its rare earths. To be sure, these institutional systems do provide a forum for arbitration, but if taken too far, these international organizations will only further deteriorate current relations with China. So what alternatives are there for dealing with China's abrasive rare earth policy actions apart from the current WTO dispute resolution case? What if the United States were to encourage China to allow foreign companies to mine rare earths in China if such firms helped to improve environmental mining conditions in China in exchange for a guarantee that a certain percentage of rare earths could be exported?[146] As China claims this is a major factor behind its rare earth policies, this proposition would not only help the United States attain essential rare earths, but it would also mitigate much of China's environmental degradation problems. Nevertheless, rather than taking a standard realist response toward China's recent rare earth policy actions, I believe its critical for Washington to implement a more complex strategy in order to tackle Beijing's recent actions.[147]

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145 Ibid., 25.

146 Morrison and Tang, "China's Rare Earth Industry and Export Regime," 35.

147 Shambaugh, "Coping with a Conflicted China," 25.

E. U.S. POLICY OPTIONS

Although there are many solutions to address the nearly total U.S. dependence on Chinese rare earths, I agree with Valerie Grasso in assessing the following four options as having the greatest impact for securing a source for rare earths and addressing U.S. national security interests: create new rare earth stockpiles for defense purposes; identify alternatives to rare earths; provide additional financial assistance for rare earth production within the United States; and establish partnerships with foreign allies capable of supplying rare earths.[148]

1. Defense Related Stockpiling

Grasso's first recommendation is for the U.S. congress to mandate a strategic REEs stockpile. By creating such strategic reserves, these stockpiles could increase the security of the domestic U.S. supply for rare earths.[149] According to the United States Magnetic Materials Association (USMMA), a trade organization dedicated to restoring an end-to-end supply chain of rare earth permanent magnets:

> This strategic stockpile would ensure our Department of Defense has ready access to those materials needed to ensure our national security and to incentivize the return of domestic manufacturing. With defense critical materials such as dysprosium being sourced solely from China, it is critical that the Department of Defense have access to rare earth oxides from reliable producers and manufacturers in the United States and ally nations to perform value added processes, such as metal, alloy and magnet manufacturing.[150]

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148 Grasso, "Rare Earth Elements in National Defense," 14.

149 Ibid., 16.

150 "*USMMA Calls For A Rare Earth Strategic Reserve*" *Businesswire*, February 23, 2011, http://www.businesswire.com/news/home/20110223006331/en/USMMA-Calls-Rare-Earth-Strategic-Reserve, quoted in Valerie Bailey Grasso, "Rare Earth Elements in National Defense: Background, Oversight Issues, and Options for Congress," Congressional Research Service, 2011, 16.

2. Rare Earth Alternatives

Another possible U.S. option to securing a source for rare earths could include reducing Department of Defense (DoD) consumption of rare earth elements by identifying and attaining equally effective alternatives to rare earths. Although attaining rare earth substitutes for the DoD industry might be difficult as specific rare earth elements are often necessary to manufacture defense critical weapon systems, additional research and development efforts could discover new rare earth-free materials required by DoD.[151]

3. Rare Earth Research Funding

With the strategic significance of rare earths expanding, and the need to augment rare earth research and development, it is essential to consider the benefits in funding rare earth application sciences, particularly in curriculums for military and other government organizations intended to train young students and scientists.[152] This new research and development will not only make the U.S. rare earth industry more sophisticated but its advancements in rare earth production will ultimately lessen the burden of U.S. dependence on China.

4. Foreign Ally Partnerships

Another option for the United States given the near total dependence on rare earths from China would be to aggressively pursue joint ventures with other nations. By actively engaging in partnerships with foreign allies, the United States can better assure its likelihood of securing the needed rare earths for its defense industry. The only potential downside to this option includes the sourcing used by these partner nations. For instance, should the U.S. DoD rely on an ally for rare earth metals, and that nation attain its oxides from China, this partnership may not provide the necessary security of supply.[153] Although, in the end, the more

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[151] Grasso, “Rare Earth Elements in National Defense,” 14.

[152] Ibid., 17.

[153] Ibid., 18.

available sources the United States can acquire internationally, the less likely China can use its rare earth policies as a tool of economic statecraft.

F. CONCLUDING THOUGHTS: RENEWED RELATIONS WITH CHINA

Despite the aggressive posture China has taken with the United States through its REE policies, if the U.S. is to remain a vibrant twenty first century economic power it must also maintain close cooperation between and among developed nations such as China. Due to the interdependent nature of the global economy, the United States, like other nations, is dependent upon overseas markets to not only sell its exports but also to maintain its access to scarce commodities and resources like REEs. As a result, we are likely to see the United States maintain an enduring relationship with China, but only to secure its current position as the world's global hegemon.

As for China, "few countries are poised to have more impact on the world over the next 15-20 years than China. If current trends persist, by 2025 China will have the world's second largest economy and will be a leading military power."[154] Nevertheless, the pace of China's economic growth rates will likely slow or possibly recede, as the nation will undoubtedly be faced with social pressures arising from income disparities, a decaying social safety net, faulty business regulation, energy demands, and environmental degradation. Although much of China's economic growth is and will continue to be domestically driven, certain key sectors such as rare earths depend on international markets and foreign acquired technology. As such, China's economic growth and development is ultimately affected by other countries, particularly the United States.[155] If China truly desires to maintain unprecedented growth rates and continue to modernize the structure of its economy, then it must relinquish its current behavior tied to rare earth policies and employ free trade and fair access with its global partners.

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[154] United States National Intelligence Council, *Global Trends 2025: A Transformed World* (November 2008).

[155] Ibid., 30.

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